GEEL 2000 Language Schools



Primary (6), Unit (1)

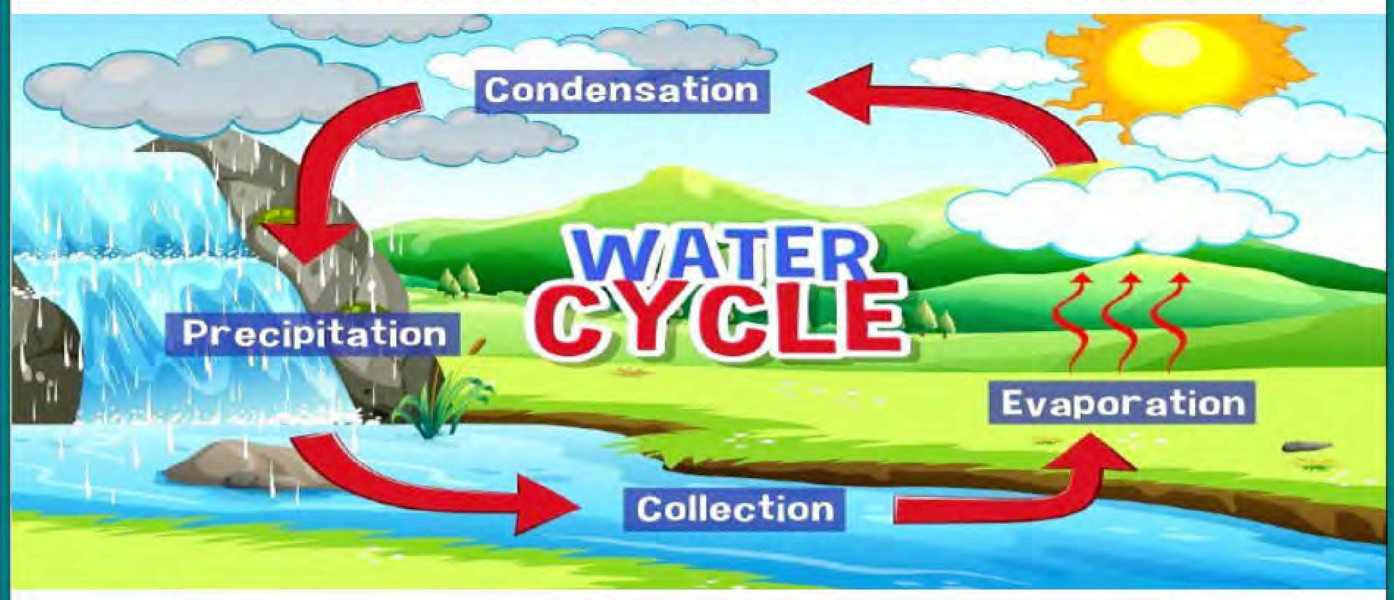


Second term

(2023-2024)



Concept (3.1, 3.2) and worksheets with model answer



Name:...

Class:...

Concept (3.1) Lesson (1)



Energy transfer through the water cycle

Water exists in 3 states in nature:

Solid (ice)	Liquid (water)	Gas (water vapor)

Water changes from one state to another when it gains or loses energy.

Sun	Water
Transfers thermal energy to the water in the puddle.	Heats up and evaporates into water vapor so the small puddle is dried and disappeared.

Example:- when the water of the small puddle is heated.

Give reason for:

The sun is the most important source of energy that drives the water cycle.

Because energy of the sun is needed for:

1) Melting ice into liquid water.

2) Evaporation of liquid water into water vapor.

3) Generating the wind movement which causes ocean currents that transport water to different locations on Earth.



Dropping water levels:

There was a large salt lake in Turkey that hosts huge number of flamingos.

This lake becomes a small puddle and it dries up completely in the summer.

Note:

Scientists try to conserve and rehabilitate the ecosystem in this lake and protect it from climate changes.

Flamingos

Reproduction (breeding)	Food
Migrate to the lake and reproduce when the weather is warm.	Feed on algae that found in the shallow water of this lake.



1-Increasing or decreasing the level of water in some lakes.

- Due to energy transfer in water cycle.

2-The energy transfer in water cycle lead to drought in lakes.

-Due to the increase in the evaporation of the lake water in summer.

Energy transfer in the water cycle:

The water cycle is affected by 3 main processes :

1- Evaporation process	2- Condensation process	3- Precipitation process
It is the process at which the matter changes from liquid state to gas state.	It is the process at which the matter changes from gas state to liquid state.	It is the process at which water falls on Earth in the form of rain, sleet, snow or hail (snow pellets).

After precipitation the water cycle can be affected by 2 steps:

1- Run off	2- Collection
It is the step in which water flows along the Earth's surface into the river and then into the ocean or sea.	It is the step in which rainwater falling on the Earth's surface is collected in different water bodies.

Distribution of solar energy:



The distribution of the solar energy on the Earth's surface plays an important role in evaporation process in the water cycle.

The regions on Earth's surface can be classified into:

Hottest regions	Moderate regions	Coolest regions
Evaporation process is the **greatest.**	Evaporation process is **moderate.**	Evaporation process is the **smallest.**

Sun

Sun rays

Moderate regions

Hottest regions

Coolest regions

The Earth

Worksheet (1)



Q.1: Choose the correct answer :

1. The large salt lake in Turkey is dried up due to the increase in the rate of..................process.

a) melting   b) freezing.   c) condensation.   d) evaporation.

2. Increasing and decreasing of water level in some lakes is due to the transfer of.....................through the water cycle.

a) rocks.   b) energy.   c) work.   d) wind

3. In winter, rain falls due to .... process

a) condensation.   b) evaporation.   c) collection.   d) precipitation

4. When water runs through a river then into a sea, this step is called............................

a) run off.   b) evaporation.   c) collection.   d) precipitation

5- Moderate regions are areas in which the evaporation process is................

a) the greatest.   b) the smallest.   c) moderate.   d) absent

Q.2: Write the scientific term of each of the following :

1. The main source of energy which affects the water cycle. (..................)

2. It is the process, in which water falls on Earth in the form of rain, sleet, snow or hail. (....................................)

3. It is the process in which matter changes from liquid state to gas state.

(......................................)

4. It is the step in which water flows along the Earth's surface into the river and then into the ocean or sea. (................................)

5. It is the step in which rainwater falling on the Earth's surface is collected in different water bodies. (...................................)

Q.3: Give reasons for:

1. Drying up of the large salt lake in Turkey in summer season.

....

2. Formation of fog in the early morning.

....

3. Changing of water from one state to another.

....

Q.4 :Put (✓) or (×)

1. Flamingos migrate to the large salt lake in Turkey when the weather is very cold there. ( )

2. States of water change when water gains or loses energy. ( )

3. Hottest regions are regions in which the evaporation process is the greatest. ( )

4. Falling of hail in coolest regions is an example of evaporation process.

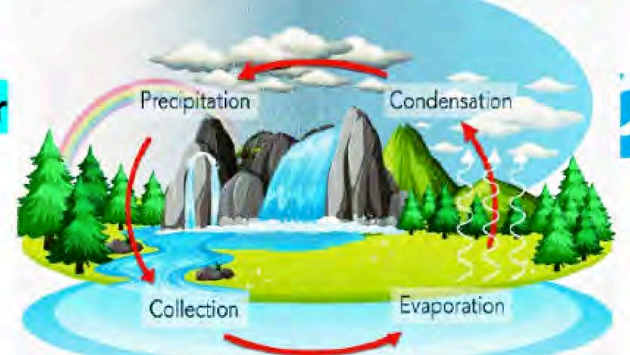
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Concept (3.1) Lesson (2)



Water cycle:

It's the continuous movement of water among different water reservoir .



Water reservoirs:

They are storage locations of water on earth.

Water reservoirs include:

1- Oceans. 2- Rivers. 3- Rocks. 4- Seas 5-Glaciers.

6- Lakes 7- Living organisms 8- Soil 9- Atmosphere

Note:

The water move among reservoirs through evaporation, condensation, precipitation, runoff and collection .

The factors affecting on water cycle:

1- Thermal energy. 2- Gravity force

1- Thermal Energy:

- Sunlight (solar radiation) includes thermal energy.
- Thermal energy causes a change in the state of water in water cycle.





When water particles :



Gain (absorb) thermal energy	Lose (release) thermal energy
It will change from solid (ice) to liquid (water).	It will change from liquid (water) to solid (ice).
Melting, evaporation and transpiration (in plant leaves) will happen.	Condensation and freezing will happen.

2-Gravity Force:

- **Wind** is a type of **force** that affects the movement of water.
- The **main force** that affects the water cycle is **gravity.**

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Gravitational force



Gravity causes	Falling of melting ice crystals and water droplets found in clouds to the Earth's surface.	Flowing of ice in glaciers or water from higher altitude area (higher elevation) to lower altitude area (lower elevation).	Leakage of liquid water down into the ground then to groundwater reservoirs.
Leads to	Flowing of water downhill into streams and rivers towards larger water bodies.	Frozen water melts and flows into the ground or the water bodies.	

Energy and water cycle:

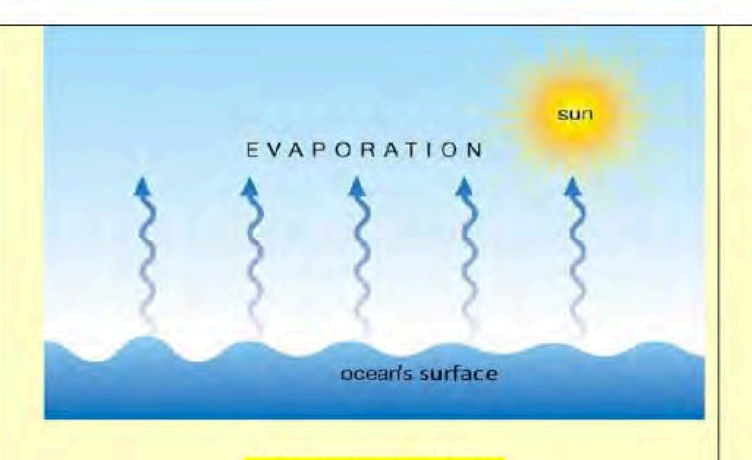
- Gaining or losing energy affects the water molecules (particles) in the air.
- The movement of air from one place to another in the presence of difference in temperature leads to

1- Evaporation	2- Condensation
Changing of liquid water to water vapor -Sun heats water in water cycle which lead to evaporation.	Changing of water vapor to liquid water (water droplets) -Air is saturated with water vapor cools due to decreasing of air temperature so water vapor changes to liquid water.

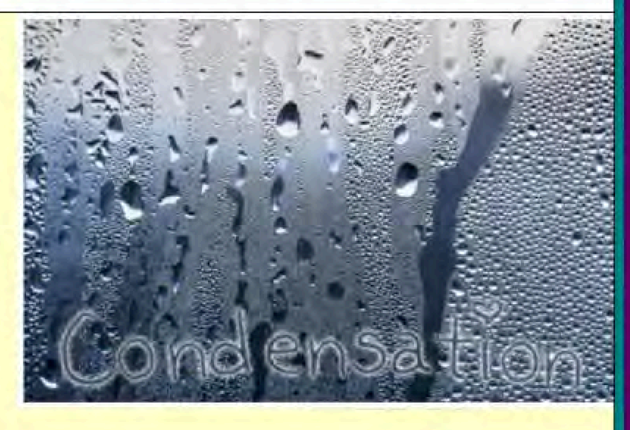












Condensation

Transpiration:

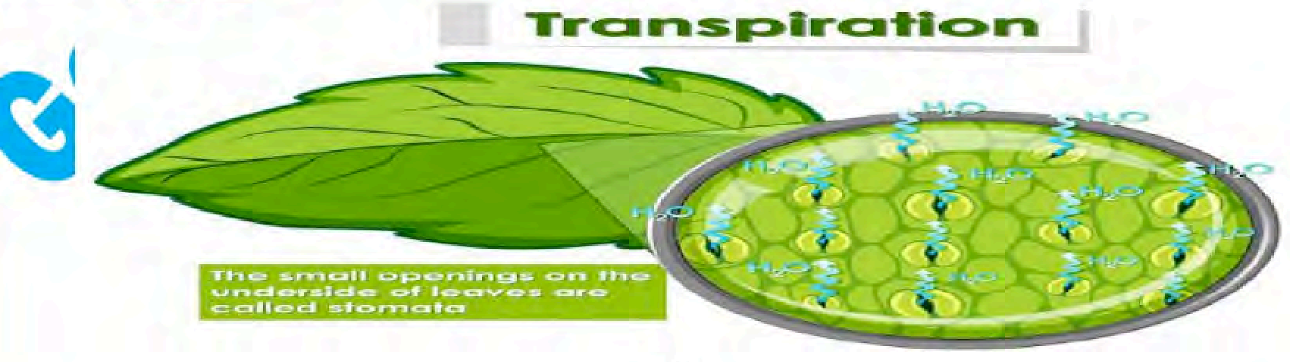
It is a type of evaporation that take place through the stomata on the plant's leaves .

Note:

- About 10% of water vapor in the air comes from transpiration of plants.

- When the amount of energy comes from the sun increases ,the transpiration in plant's leaves increases.

- Sunlight affects the amount of transpiration of plants, when the amount of the energy comes from the sun increases, the transpiration in plant's leaves increases.



How clouds are formed?



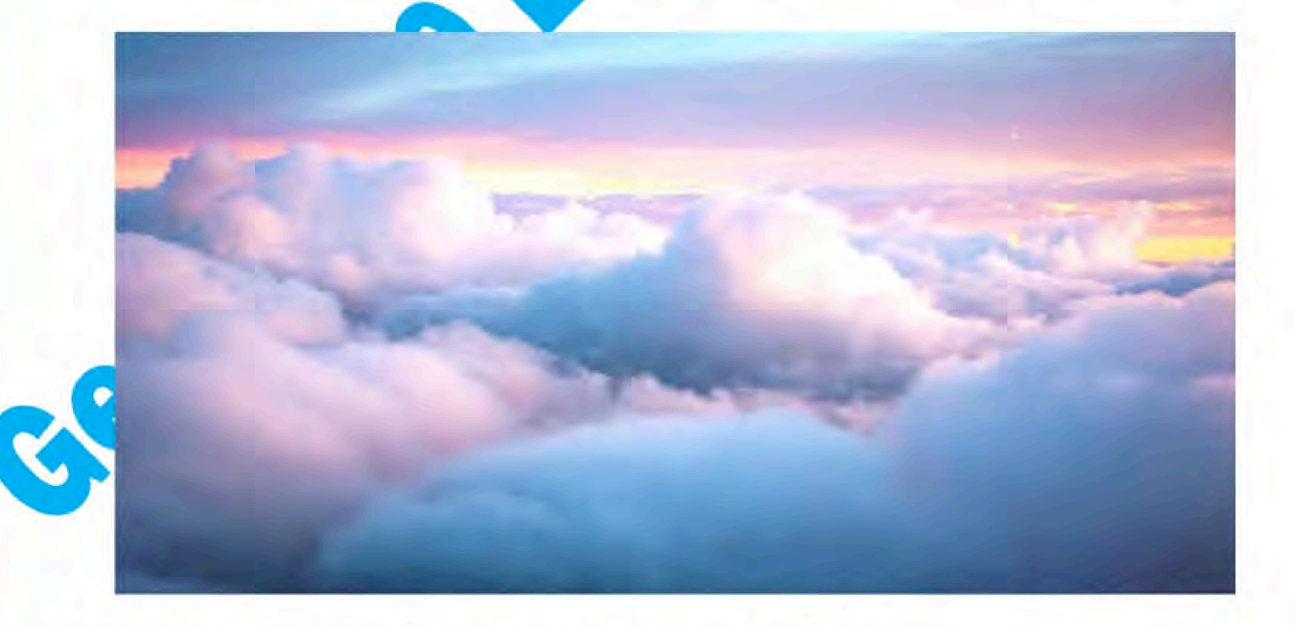
1- **Clouds** are formed due to **condensation** of water vapor into water droplets that **attach** to **particles** of dust, smoke in the air.

2- When large numbers of water **droplets join together**, they form **clouds**



Note:

- Clouds are made up of **millions of tiny water droplets** , when these water droplets become too **heavy** , they **fall** in the form of **rain.**





Worksheet (2)

Q.1: Choose the correct answer:

1. Melting of snow at the two poles, is due to the thermal energy that comes from the...................

   a. wind. b. moon. c. Sun d. Electricity

2. Leakage of water into groundwater reservoirs is due to the action of.........

   a. condensation. b. gravity. C. precipitation. d. evaporation.

3. All the following are examples of water reservoirs on the Earth, <u>except</u>......

   a. sea. b. glaciers. c. moon. d. living organisms

4. Movement of air can change the state of water from......state to......... state by evaporation process.

   a. gas - liquid. b. liquid - gas c. solid - gas. d. Solid - liquid

5. The sun heats the water of seas and oceans and this leads to occurrence of................ process

   a. freezing. b. melting. c. evaporation. d. condensation.

6. The form of evaporation process that takes place from the leaves of plants is called................

   a. transpiration. b. Collection c. melting. d. freezing



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Q.2 Put (✓)or (×):

1. The motion of air from one place to another leads to changing of water vapor into water in the air. (   )
2. Melting and transpiration processes only occur by cooling. (   )
3. When the Sun heats the water in a river, the water changes into gas state.
4. Water comes out from stomata to the air in the form of water vapor. (   )
5. You can see transpiration process when you set a plant its leaves covered with a plastic bag in the sunlight. (   )
6. As a result of low temperature, water returns back into water vapor. (   )
7. Clouds are made up of millions of tiny water droplets.(   )

Q.3: Write the scientific term of each of the following:

1. They are the places of storing water on the Earth. (......................)
2. The force which causes moving down of water from higher places to lower places on the Earth. (..............................)
3. It is a form of evaporation that takes place through the stomata which are found in plant leaves. (..................................)
4. It is the process which helps in formation of clouds in the sky. (..................)

Q.4 Give reasons for:

1. Moving down of glaciers from the top of a mountain to its foot.

....

2. Changing of some amount of water in water bodies into water vapor.

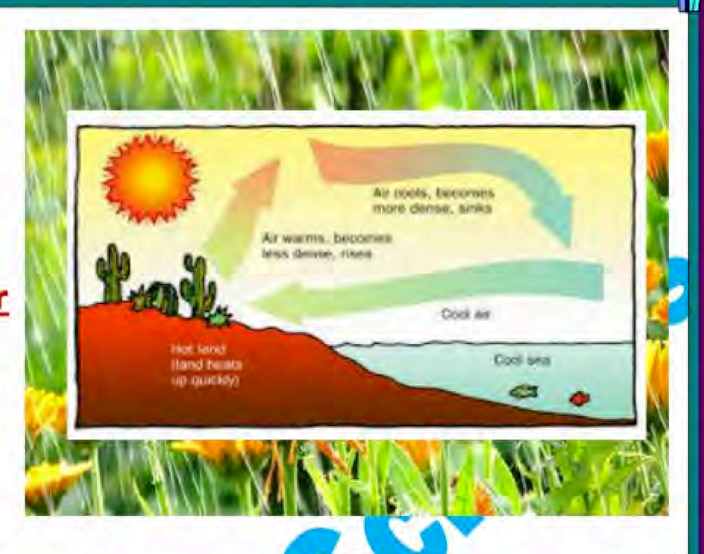
....

3. Formation of clouds in the sky.

....

Concept (3.1) Lesson (3)

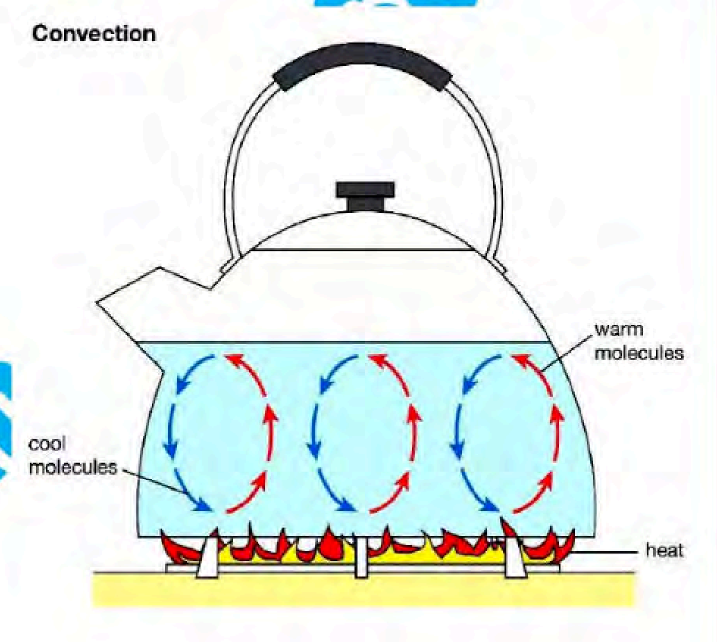
The importance of water:



- All living organisms need fresh water to survive, the plants depend on rain to grow.
- Water cycle provides water for all living organisms and regulate the weather.



Convection :



The process in which heat transfers in liquids and gasses ,where hot molecules (less density) rise upward ,while colder molecules (more density) fall down.



Notes:

The heat of the sun transfers from space to Earth by radiation.
The heat can transfer through Earth's atmosphere by convection in the form of convection currents.
convection currents in Earth's atmosphere help in determining the regional climate.





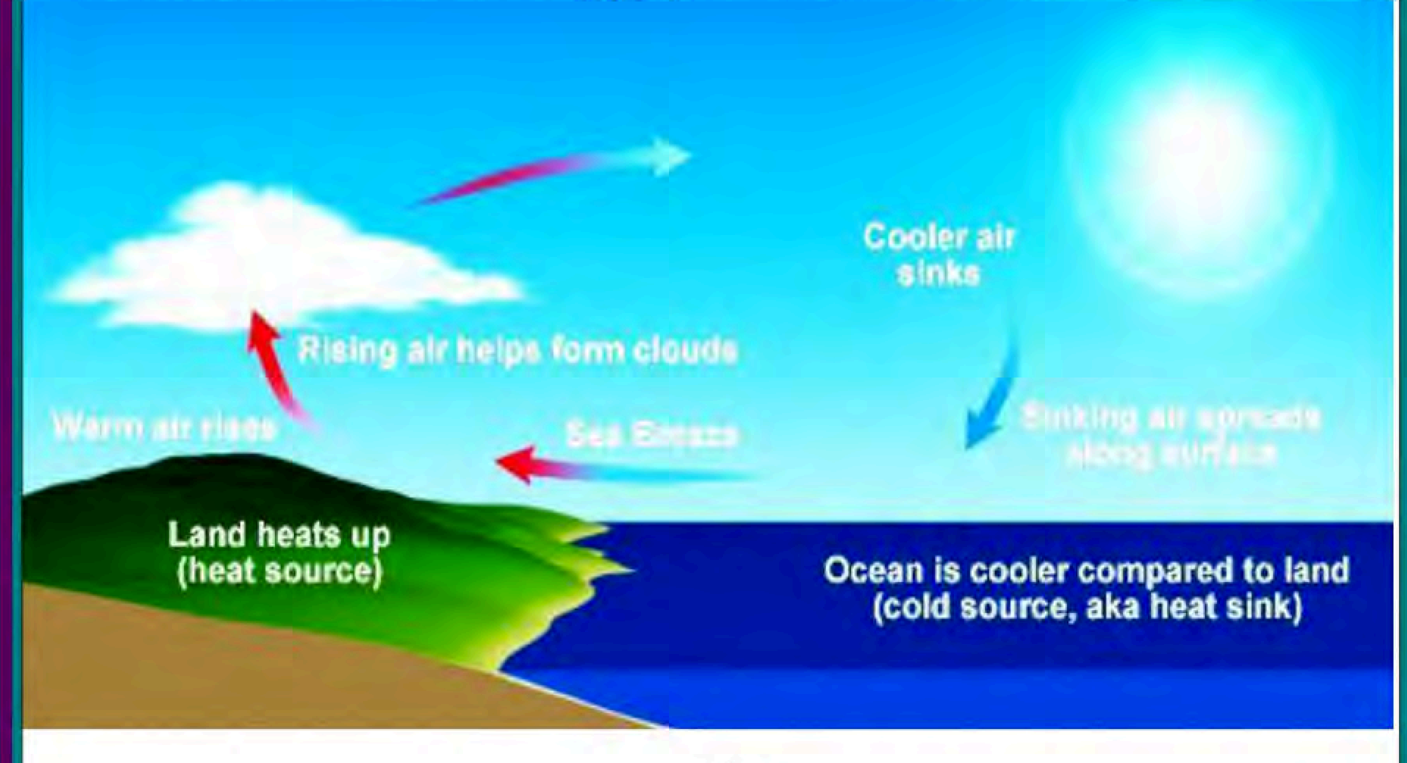


Convection in liquids and gasses



- When a liquid or gas is heated, it expands and becomes less dense (light), so it rises upward.
- The cold liquid or gas is more dense ,so it moves downward and replaces the warm one.
- The movement of warm and cold liquid or gas form cycle of convection currents.
- Gravity helps in rising and falling of liquids and gases which leads to rotating the convection currents causing formation of wind and ocean currents.

And it affects the movement of water in water cycle.



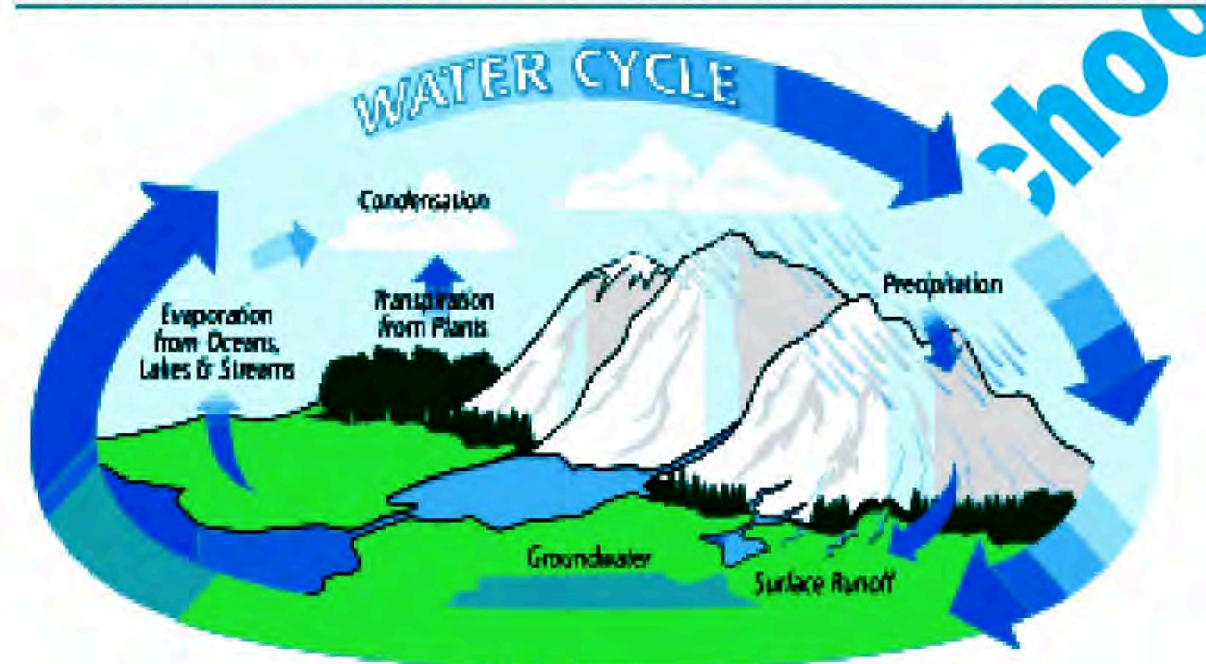


Notes:



Convection currents in Earth's atmosphere help in determining the regional climate.

Relation between convection and condensation



- Convection causes the raising of temperature of air that contains water vapor
- Condensation happens when this raising air loses its heat and the cold water vapor changes into water droplets and finally form clouds.

Note:

Condensation and freezing occur when water particles lose thermal energy, while evaporation, melting and transpiration occur when water particles gain thermal energy.





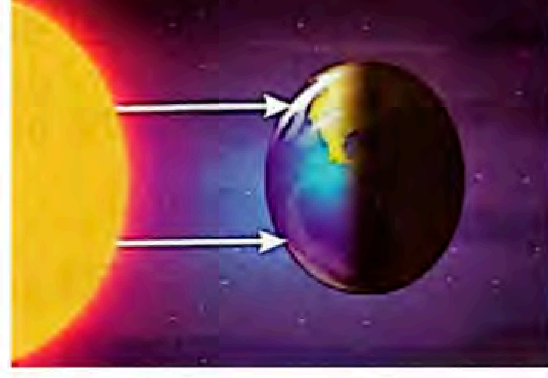


The heating of Earth

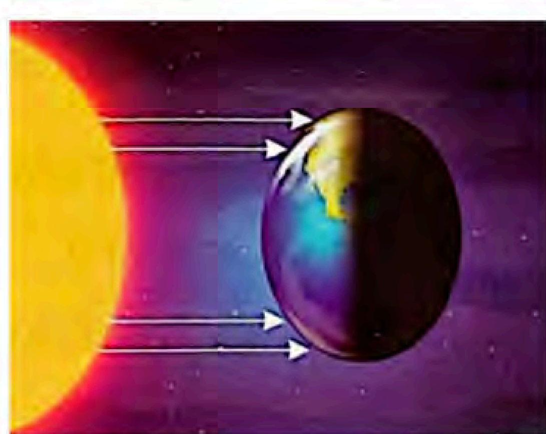


- Getting closer or moving away from the equator affects <u>the weather.</u>
- <u>Area near the equator is hot</u> and <u>humid</u>, as we move away to north or south of the equator depends on temperature and precipitation at these areas where :the weather could be warm and humid or freezing cold.

- When sun rays <u>fall perpendicular</u> on Earth's surface in the area near equator, the rays are concentrated on a small area and giving high effect of heat, so weather will be hot.



- When sun rays <u>fall semi -inclined</u> (semi-slanted), (low effect of heat), the weather will be warm.



- When sun rays <u>fall very inclined</u> (slanted) (lowest effect of heat), so the weather is very cold.

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Worksheet (3)



Q.1) Choose the correct answer:

1-Gathering the water of rains to form streams, rivers or lakes, is called ....

a) precipitation b) evaporation. c) collection d) condensation

2- Due to the very little rains which precipitate in some areas on Earth, large areas of ....are formed.

a) forests b) seas c) oceans d)deserts

3- Fresh water stored underground in the form of groundwater by the effect of ....

a) condensation. b) electricity. c) gravity. d) evaporation.

4-water in oceans changes into ....when water gains thermal energy.

a) liquid water b) water vapor c) snow d) sleet

Q.2) write scientific term:

1- The cycle that involves that continuous movement of water from different water bodies to atmosphere then falling back to the earth. (........................)

2- It is the method by which heat of the sun transfers from the space to Earth's atmosphere. (..............................)

3- It is the method by which heat transfers in liquid and gases. (..................)

Q.3) Give reason for:

1-Hot air moves upward above cold water.

....

2-The weather in area near the equator is hot.

....

Q.4) What happens when:

The density of air if the cold air is warmed by the effect of solar energy.

....

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Concept (3.1) Lesson (4)



Convection currents and the water cycle



- Mixing blue and yellow colors produce green color

- Convection currents and gravity force affect the movement of water through the water cycle.



Wind is the main factor in determining weather, so change in wind causes change in weather.

- Wind carries heat, moisture, rain, snow, dust, sand ,........
- Earth has a global wind system that consists of winds below in a constant direction over a long periods of time.
- Unequal heating of the Earth between the poles and equator generates wind.
- Wind helps in transporting water through water cycle by carrying water vapor or by forming of ocean currents.



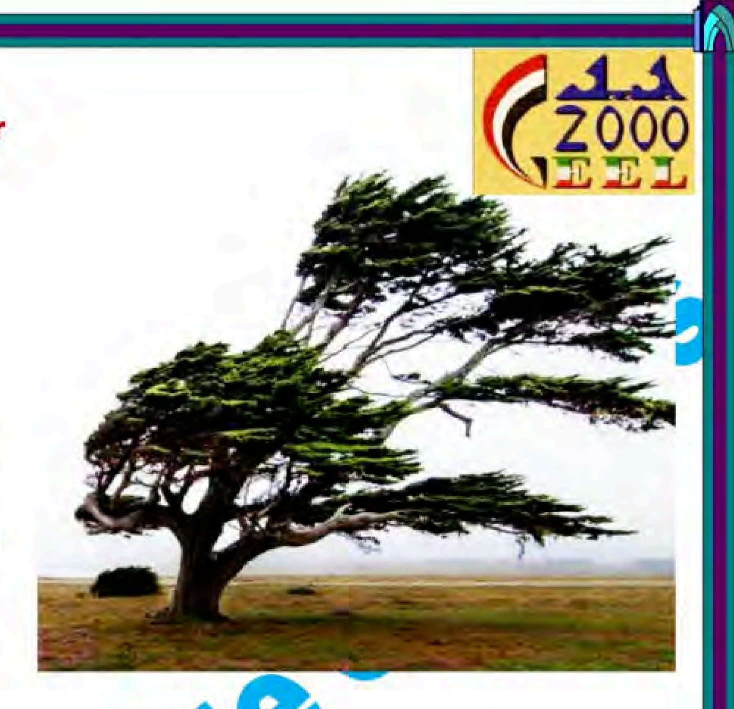
Factors affecting wind direction:

1-Amount of solar radiation that reaches the Earth.

2-Rotation of Earth.



Wind forms by movement of warm air which rises up and it is replaced by cooler air.



* If the warm air contains enough amount of water vapor during its rising, water vapor condenses and the air loses this water in form of rain.

* At the same time cooler air replaces the rising warm air, so warm air cools and descends.
* By the time, it reaches the Earth's surface again and it becomes dry.
* The dry air forms a group of dry deserts around the Earth, then air flows back again to the same place.

What happens if there is no wind on Earth?

1- Some ecosystems will change completely and others may disappear.

2- The regions around the equator become very hot and poles will completely freeze.







Worksheet (4)



Q.1) Complete the following using the words below:

(Rotation – deserts – direction – upward - solar radiation – winds – rain- downward)

1-The global wind system of the Earth consists of ....that blow in a constant ....over a long periods of time.

2- Dry air causes the formation of large areas ....around the Earth's surface.

3- The direction of wind is determined by the amount of ....received by the earth and..................of the earth .

4- When warm air is cooled, it will move ...., while cold air moves ....when it is warmed.

4- When warm air contains enough water vapor ,it loses this water in the form of ....

Q.2) Put (√) or (x):

1- Unequal heating of the earth between the poles and the equator generates wind. ( )

2-Deserts are formed by the effect of moist air. ( )

3-wind is caused by the continuous exchange between warm air and cold air.

4-Due to radiation currents, warm water moves above cold water. ( )

5- Solar energy is the main energy which the causes the movement of convection currents in atmosphere and oceans. ( )



Q.3) Write the scientific term:

1- It is caused when air warmed by the solar radiation rises and then replaced by cooler air that flows from nearby areas. (…………………………….)

2- Large areas of land which are formed due to the effect of dry air. (…………..)

3- It is the main source which is responsible for warming of air and forming wind. (………………………………..)

Q.4) What happens to ?

1- The air temperature if there is no wind on Earth.

……

……

Q.5) Give reason for:

The formation of wind is determined by the amount of solar radiation received by the Earth.

……

……



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Concept (3.2) , Lesson (1)



Heat and weather changes

The reasons of change in weather:-

1- The density of cold and dry air is more than that of hot and humid air

2- When a part of air becomes hot and humid by the heat of sun.

3-When the hot and humid air meet the cold and dry air, the hot air rises and becomes colder, this coldness causes water vapor in hot air to condense then the rain falls.

Give reason:

***Hot air moves up while cold air moves down.**

Because the density of cold and dry air is more than hot and humid air.

Meteorologist



The scientist who uses a variety of tools and instruments to study and forecast weather.



Give reason:

Sometimes people prefer to live in desert than in cities.

-Due to fast population growth in cities.



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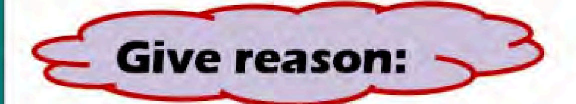
Farmers use new ways to make the soil of desert fertile and fruitful such as:

1-They improve the soil quality.

2-They plant crops that are able to grow in the hot climate and low fertility soil.

3-They use new ways to irrigate crops such as reusing water.

4- They use wind and the Sun to power their farms in desert with wind turbines or solar energy.



Desert farming faces many difficulties.

Because the desert's climate is hot and the amount of water is small.



✱Deserts receive about 250 millimeters of rain per year.

✱In desert more water evaporates than that falls by precipitation.

MOUNTAIN RANGES AT COASTAL REGIONS HAVE TWO SIDES:

*Wet side that faces the coast.

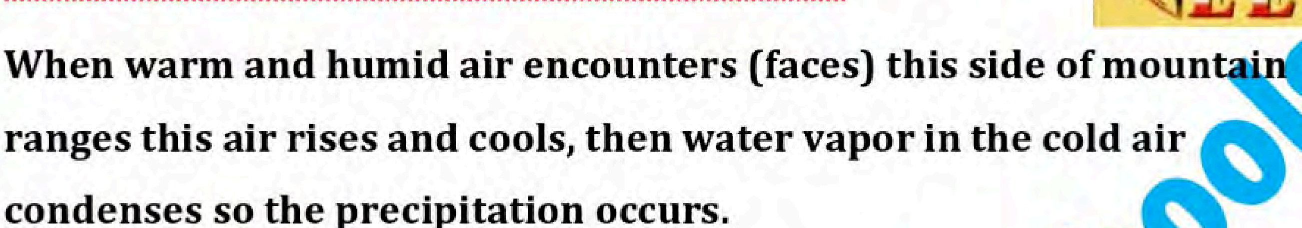
*Dry side that is away from the coast.





Rain shadow phenomenon:-

At the wet side that faces the coast:



When warm and humid air encounters (faces) this side of mountain ranges this air rises and cools, then water vapor in the cold air condenses so the precipitation occurs.

At the dry side:

The air descends and becomes warm so the air dries the land of this side.

As air rises over mountains, it cools causing moisture to condense and fall as precipitation.
Dry air decends & warms, promoting evaporation.
Moist, warm air incoming
Rain/Snow windward slope
Dry leeward slope
Rain Shadow

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Changes in the atmosphere

The properties	At the bottom of the mountain	At the top of the mountain
The atmospheric Pressure	High	Low
The air temperature	High	Low
The air density	High	Low

Note:

As we go from the bottom of the mountain to up.

Air (atmospheric pressure) decreases.

Air temperature decreases.

Air density decreases.



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Worksheet (1)

Q.1 Choose the correct answer:-

1-A rain shadow is an area that is formed behind a…………..

a- tree b- mountain c-building d bridge

2-The density of cold air is ……………than that of hot humid air.

a- more b-equal to c-less d-similar to

3- If the temperature at the bottom of a mountain is 15°C, this means it may reaches ……………°C at the top of this mountain.

a-30 b-25 c-20 d-2

Q.2 write the scientific term of each of the following:-

1- A scientist who studies atmosphere to understand Earth's weather. (……………………)

2- A side of mountain ranges at coastal regions that face the coast. (……………..……..)

3- A side of mountain ranges at coastal regions in which the phenomenon of rain shadow occurs (……………………..)

Q.3 Give reason for:

1-Desert farming faces many difficulties.

………………………………………………………………………………………

2-Hot air moves up while cold air moves down

………………………………………………………………………………………

3- Sometimes people prefer to live in desert than in cities

………………………………………………………………………………

Q.4 What happen if:

1-The atmospheric pressure as we move up toward the top of mountain.

………………………………………………………………………………

2-Air density, as we move down toward the bottom of a mountain.

Meteorology	• It is the science of studying and predicting the weather.
Meteorologist	• The scientist who uses a variety of tools and instruments to study and forecast weather.
Thermometer	• It is a device used to measure the temperature.
Barometer	• It is a device used to measure the atmospheric pressure .
Atmospheric pressure	• It is the amount of force that air exerts on its surroundings. Or • It is the weight of the air above a certain area.
Humidity	• It is the measure of how much water vapor is present in the air.





Meteorologists: use some tools like satellites , airplanes and weather balloons to carry measuring instruments high into the atmosphere to measure conditions of weather from different altitudes .

Satellites and weather stations
↓ Have
Devices designed transmit data
↓ From
The satellite or station
↓ To
Meteorologists

- Meteorologists try to collect a lot of data about (air temperature , atmospheric pressure , wind , precipitation , humidity and other weather conditions)

Analyzing the data

- Meteorologists usually use weather maps : to collect data from different places and over short periods of time .
- Mapping data (mapping measurements) ⟶ means representing data on map (like air temperature , atmospheric pressure and humidity)
- its function : allows meteorologists to see the important weather conditions such as the movement of air

Putting it al together

- Collecting and analyzing data about the atmosphere is just one part of predicting the weather .
- Meteorologists also need to observe some other factors that affect the atmosphere such as landforms .
- use complex computer models (G.R) ? to predict how these fifferent factors will interact



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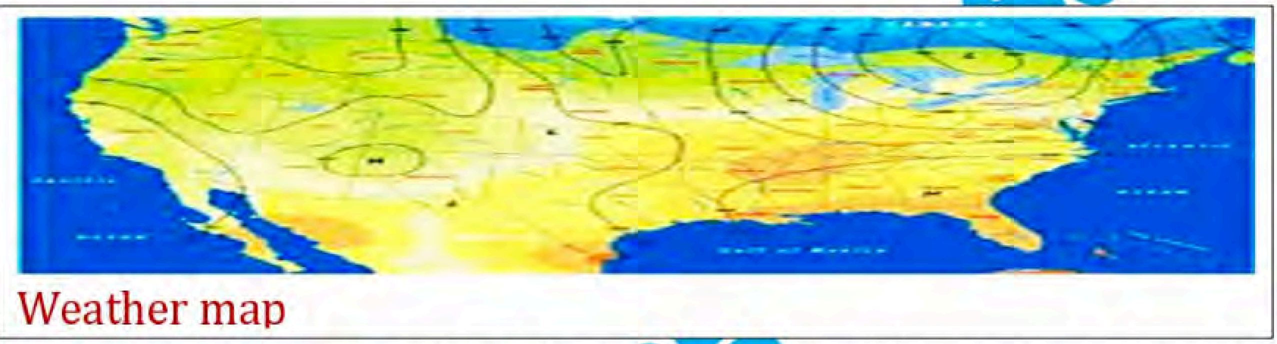


Weather forecasts can be uncertain for next days or weeks , where



- Some small unexpected changes in wind , air temperature or moisture in air **can affect next week's weather**

- Sometimes unexpected and quickly changes happen in the weather conditions that makes meteorologists **could not predict the weather of next days**



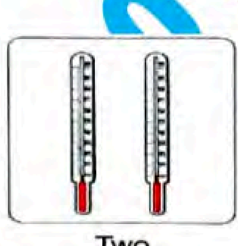
Weather map

➢ **This experiment to collect data that shows differences in the effect of thermal energy from the sun on land and water, and how these differences may impact air temperature in a certain area.**

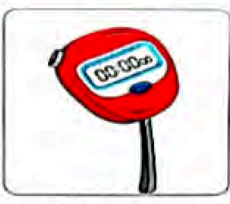
➢ Tools:



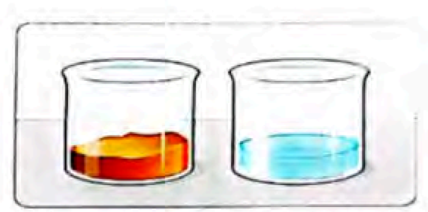
Reading lamp



Two thermometers



Stopwatch



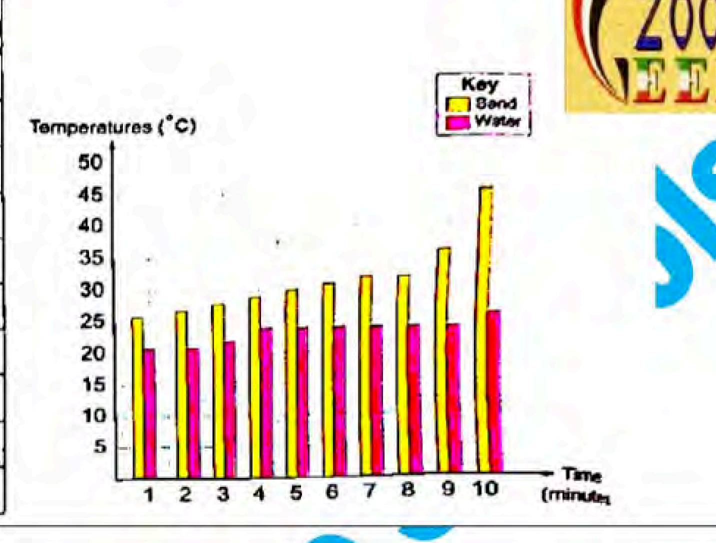
Equal amounts of sand and water in two beakers

➢ Observations :

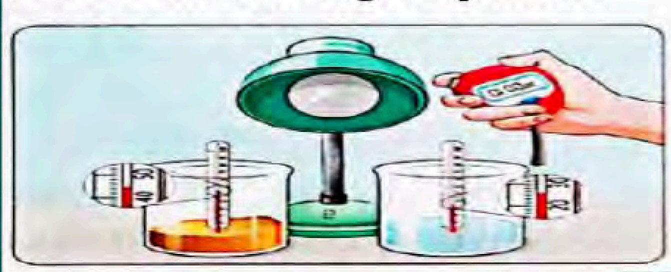
1-When the reading lamp is on :



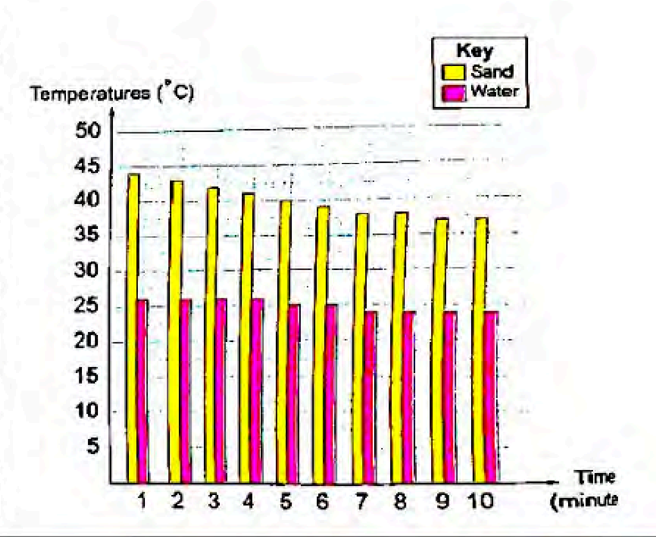
Time (minute)	Temperature of sand (°C)	Temperature of water (°C)
1	26	21
2	27	21
3	28	22
4	29	24
5	30	24
6	31	24
7	32	24
8	32	24
9	36	24
10	45	26



2-When the reading lamp is off :



Time (minute)	Temperature of sand (°C)	Temperature of water (°C)
1	44	26
2	43	26
3	42	26
4	41	26
5	40	25
6	39	25
7	38	24
8	38	24
9	37	24
10	37	24









➢ Conclusions:

- Sand is **heated up** faster than water.
- Sand is **cooled off** faster than water.



Notes :-

- **When the lamp is on, it simulates daylight .**
- **When the lamp is off, it simulates night .**
- **The effect of thermal energy of the sun on land (sand) differs from that on water , and this causes the change of air temperature above land or water areas on the Earth's surface .**

(Give reason:)

At noon we may not be able to stand barefoot on the sand of a beach in summer, but we can swim in the sea water?

Because sand is heated up faster than water





Worksheet (2)

Q.1) Choose the correct answer :-

1-The barometer is used to measure ……………………

a- air temperature b- atmospheric pressure

b- mass d- length

2-Heat transfers from the …………object to the …………object .

a- big – small b- small – big c- hot – cold d- cold – hot

3- If the temperature of the sand in a desert is 50 °C at noon , its temperature may be reach ……….°C at night .

a- 20 b- 60 c- 70 d- 80

Q.2) Put (√) or (×) :-

1- Sand cools down in a shorter time than sea water during nighttime .

2- Mapping data allows meteorologists to represent data about weather conditions . (   )

Q.3) Write the scientific term of each of the following :

1- The science that studies the weather conditions . (……………………)

2- A scientist who studies the Earth's atmosphere and forecasts the weather. (……………………………………)

3- A device used to measure atmospheric pressure. (………………………)

4- A device used to measure temperature. (…………………………)

5- It is the weight of the air above an area. (……………………………)

Q.4)What happens to ?

1-The temperature of a desert sand at night?

…………………………………………………………………………………………………

Concept 3.2 , lesson (3)



When air is heated	When air is cooled
It expands as its molecules spread out away from each other → The hot air becomes less dense and move up.	It contracts as its molecules come close to each other → The cool air becomes more dense and move down.

Hot air moves up , while cool air moves down?

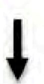
Because hot air is less denser than cool air

First experiment :

	
Sprinkle talcum powder over a cool light bulb (turned off light bulb) → The talcum powder spreads and interferes with the cooler → And more dense air around the light bulb.	Sprinkle powder over a hot light bulb (turn on light bulb) → The powder rises above the light bulb (G.R) Because the light bulb in this case releases heat , which causes the air above it to rise and carry the powder with it

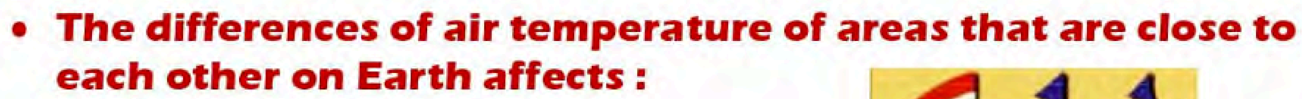
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❖ Second experiment :

	
The paper spiral over a **cool** light bulb, (**turn off** light bulb)  The paper spiral **doesn't spin** that shows that the air around the paper spiral doesn't move.	The paper spiral over a **hot** light bulb (**turn on** light bulb)  the paper spiral spins (G.R) Because the air around the paper spiral **expanded** and became **hot** So ,the air molecules became **less dense** and **moved upward** ➢ While the **cooler** and **more dense** molecules **moved downward** ➢ Which creating a **convection current** that make the paper spiral <u>spins without stopping</u>

Notes :

- **Warm** air **rises up** .
- **Cold** air flows **down** and replaces the warm air.
- The **vertical** movement of air (up and down movement) is called <u>(air current)</u>
- The **horizontal** movement of air (left and right movement) is called <u>(wind)</u>



- **The differences of air temperature of areas that are close to each other on Earth affects :**

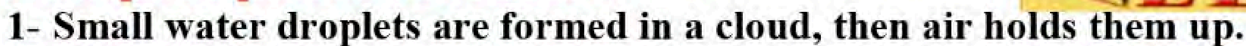
  1- The speed of air current.

  2- The speed of wind.

  3- The direction of wind movement.

Tools and technology can help meteorologists make more accurate predictions about weather.

Anemometer	• It is a device used to measure the **wind speed**. 
Weather radar	• It detects the intensity and **speed** of **precipitation** and **tracks thunderstorms** and **hurricanes**. 
Rain gauge	• It measures the **amount of rain** in a certain area. 



How precipitations occur?

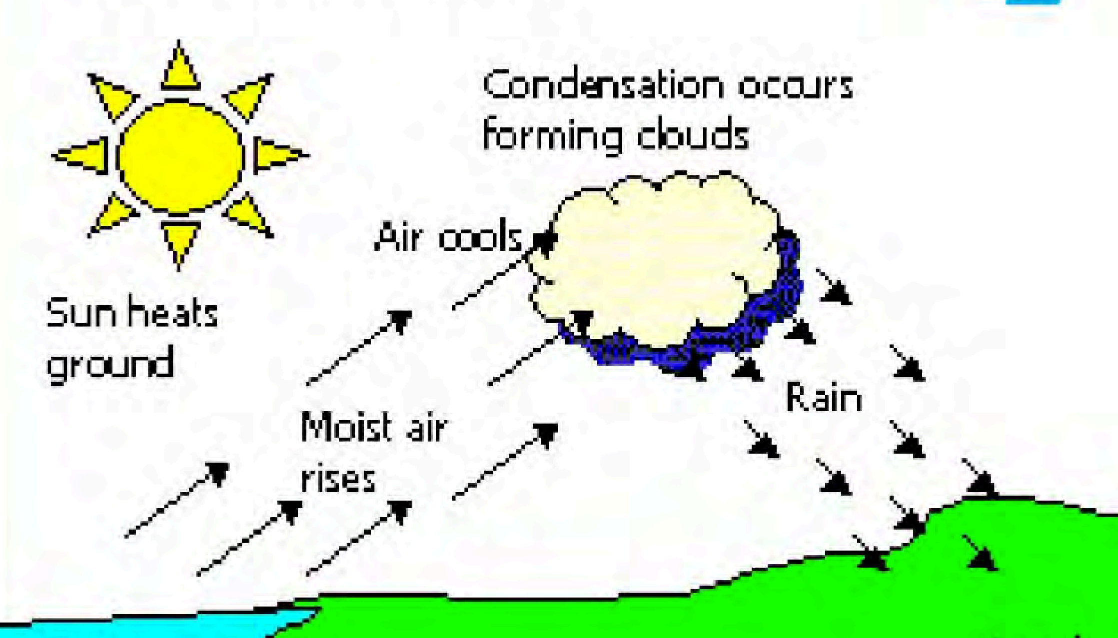
1- Small water droplets are formed in a cloud, then air holds them up.

↓

2- Water vapor condenses and the droplets become bigger and heavier.

↓

3- Gravity pulls the big and heavy water droplets toward the ground, and the precipitation occurs.



Snowfall	Snow is formed when the air in clouds is cold enough to change the water droplets into ice crystals that fall to the Earth's surface in the form of snow.






Worksheet (3)

Q.1) Choose the correct answer:-

1-The form of energy that flows that flows from a hot object to a cold object is called ………………..energy.

a- sound b- thermal c- magnetic d- potential

2-Convection currents in the atmosphere are controlled by ………………

a- precipitation b- moon's rotation

b- the energy from the sun d- Earth's rotation

3-Heat is transferred through the atmosphere by …………………

a- convection b- conduction c- reflection d- absorption

4-When air is heated , its …………….changes .

a- mass b-smell c-color d-density

Q.2) Complete the following sentences :-

1-The density of hot soup is ……………..than that of cold soup.

2- Gases and liquids expand by ……………and contract by cooling .

4- When air is heated, it expands as its molecules move ……………..each other .

4-The horizontal movement of air is called ……………., whereas the vertical movement of air is called ……………………

Q3)Give reason :-

1-When air is heated, it expands ?

……

Q4)What happens to ?

1-We boil water in a pot on the stove?

(Concerning the movement of hot water and cold water)

……

Under Supervision: Mrs. Dalia Fawzy



Concept 3.2 , lesson (4)

-The effect of too much or too little precipitation:

- **The too much or too little rain change ecosystems and may cause:**

- Damaging buildings and agricultural systems.
- Injuries and deaths.
- The occurrence of extreme weather phenomena such as drought and flood.

Drought	Flood
It is the shortage of water that is available for drinking, growing crops, farming animals and industry.	It is the increase in the flow of water over the edges of riverbank and onto the land around the river.
It occurs when an area is affected by dry weather for a long period of time due to the extreme hot temperatures, where there is not enough water for people, planets, and animals. 	It occurs due to: -The increase in the rate of rainfall that happens every two years causes the river water to flow over the edges of the riverbank and onto the land around the river. -The sudden melting of snow and ice over a region. 

-Notes

1. Every few decades, very extreme floods occur causing damages and loss of life.
2. Flood is more danger if the land around the flood is frozen and cannot absorb the water.

-Harms of floods:



- Damaging buildings by moving or breaking them.
- Death of people and animals.
- Harming of economy.

-Advantage of floods:

- Some ecosystems depend on periodic floods such as ecosystems along the Nile.

-Sandstorms (dust storm):



- Sandstorm occurs when very strong winds blow up sand or dust or both of them from a dry area such as deserts.

- **We can easily see sandstorms as they extend for several kilometers long, and their height may reach hundreds of meters.**

Harms of sandstorms:

1- Dust reduces visibility during driving cars.

2- Dust accumulates on solar panels, so they stop generating energy.



3- Dust fills up irrigation canals, so the water quality decreases.

4- Dust damages the plane engines.

5- Dust harms the human eyes and respiratory system.





Worksheet (4)



Q.1- Put (√) or (x):-

1. Heavy rain may cause drought. (   )
2. When rain doesn't fall, soil may dry, and plants may die. (   )
3. Although flooding is harmful, it also has some benefits. (   )
4. Sandstorms blow up from dry areas such as seas and oceans. (   )
5. Sandstorms decrease the visibility during driving cars. (   )
6. Floods may cause death of people and animals. (   )
7. Dust storms have harmful effects on the plane engines. (   )

Q. 2-Complete the following sentences:

1- Extreme hot temperatures may cause..................

2- Heavy rain may cause.... ....

3- Sandstorms. ....the chances of car accidents.

4- Dust storms... ....the water quality in irrigation canals.

Q.3-Write the scientific term:

1-A phenomenon in which condensed water vapor falls on the Earth's surface in the form of rain, snow, sleet, or hail. (............................)

2-It is a natural phenomenon that occurs when the level of water in a river increases until it overflows its banks. (............................)

3-A phenomenon in which very strong winds blow up dust that reduces the visibility during driving cars. (............................)

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Q.4-Give reason for:



1-Floods have some benefits.

………………………………………………………………………………………………

2-Sandstorms have harmful effects on human health.

………………………………………………………………………………………………

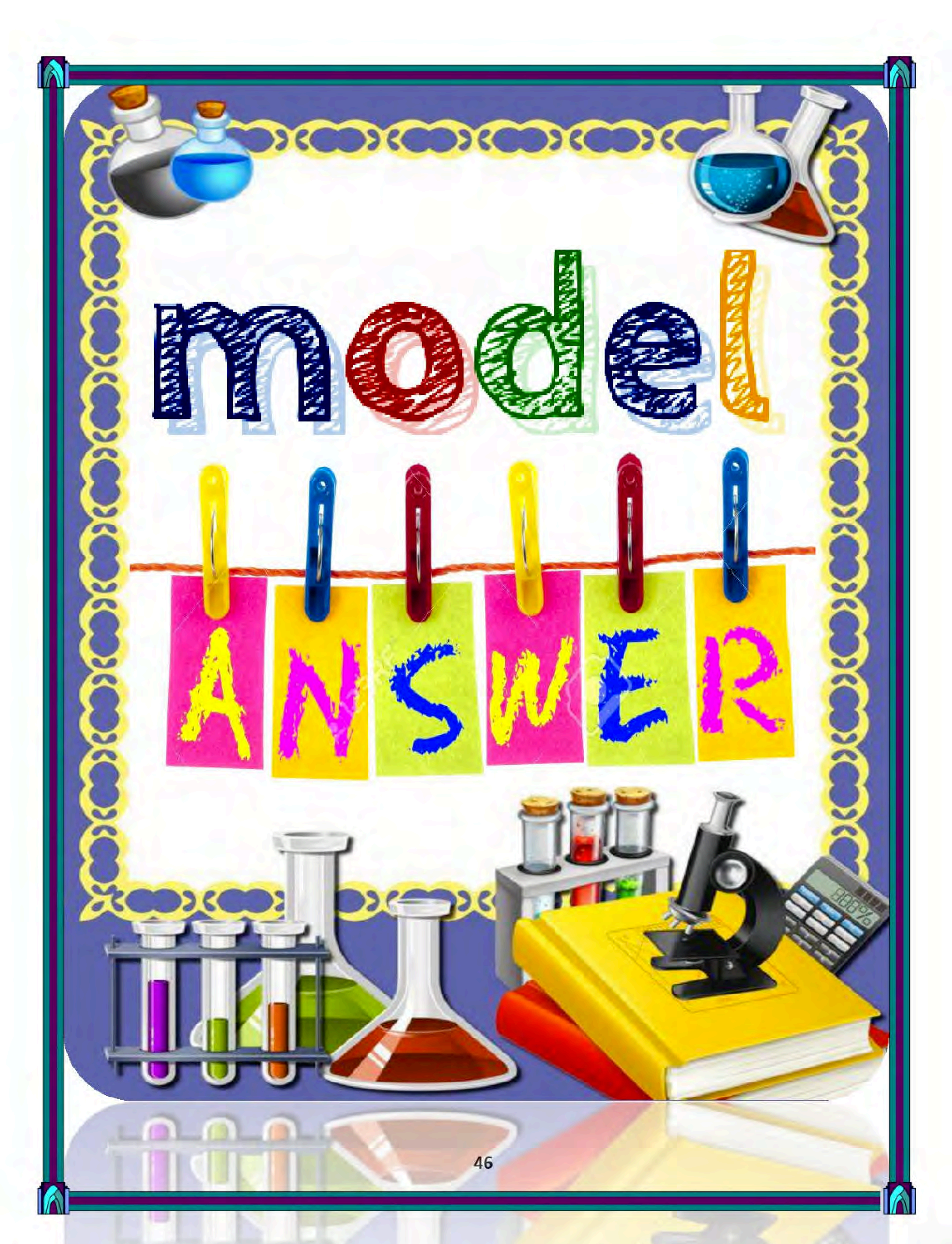
Q.5-What happens to…?

1-Buildings when they are subjected to strong floods.

………………………………………………………………………………………………

2-Solar panels when dust accumulates on them.

………………………………………………………………………………………………


model
ANSWER

Concept (3.1) , lesson (1) , worksheet (1)



Q.1 Choose the correct answer:

1- d Evaporation	5- b Energy	6- d Precipitation	7- a Runoff	8- c Moderate

Q.2 Write the scientific term of each of the following :

1-sun	2-precipitation	3-evaporation	4-runoff	5-collection

Q.3Give reasons for:

1-Due to increase in the evaporation of lake water in summer.

2-Due to Condensation process which happen as a result of lose thermal energy.

3-Because it gains or loses thermal energy

Q4 : put (✓)or (×)

1-×	2-✓	3-✓	4-×

Concept (3.1) , lesson (2) , Worksheet (2)

Q1: Choose the correct answer:

1-c (sun)	2-c Precipitation	3-c Moon	4-b Liquid –gas	5-c Evaporation	6-a Transpiration

Q.2:Put (✓)or (×)

1-×	2-×	3-✓	4-✓
5-✓	6-×	7-✓	

Q.3: Write the scientific term of each of the following:

1-water reservoirs	2-gravity force	3-transipiration	4-condensation

Q.4 Give reason.

1-Due to gravity

2-Due to evaporation process which happen when the temperature increases.

3-Due to Condensation of water vapor into water droplets that attach to particles of dust or smoke.



Concept (3.1) , lesson (2) , Worksheet (3)

Q.1) Choose the correct answer:

1	2	3	4
C	D	c	B

Q.2) Write scientific term:

1-water cycle. 2-radiation. 3-convection.

Q.3) Give reason for:

1-Due to the effect of convection where hot air (less density) rises up and cold air (more density) moves down.

2-Because the sun rays fall perpendicular on Earth's surface giving high effect of heat .

Q.4) What happens when:

The density of air will decrease.

Concept (3.1) , lesson (2) , Worksheet (4)

Q.1) Complete the following using the words below:

1- winds -direction. 2- deserts 3- solar radiation-rotation.

4- downward-upward. 5- rain.

Q.2)put (√) or (x)

1- √	2-x	3-√	4-x

Q.3) Write the scientific term:

1- wind. 2- desert. 3- sun

Q.4) What happens to ?

The regions around the equator become extremely hot and poles will completely freeze.

Q.5) Give reason for:j

Because warm air rises upward when it is heated by solar radiation and it is replaced by cooler air that flows from nearby areas.

Concept (3.2) , lesson (1) , worksheet (1)



Q.1 Choose the correct answer:

1-(b)   2-(a)   3-(d)

Q.2 Write the scientific term:

1- meteorologist   2- A wet side   3- A dry side

Q.3 Give reason:

1-because the desert's climate is hot and the amount of water is small ؛

2-Because the density of cold and dry air is more than hot and humid air.

3-Due to the fast population growth in cities.

Q.4 What happens:

1-The atmospheric pressure decreases.

2-Air density will increase.

Concept (3.2) , lesson (1) , worksheet (2)

Q1)Choose the correct answer :-

1- b	2- c	3- a



Q.2)Put (√) or (×) :-

1- (√)	2- (√)

Q.3) Write the scientific term of each of the following :

1- Meteorology	2- Meteorologist	3- Barometer	4- Thermomerter	5- Atmospheric Pressure

Q.4)What happens to ?

1- The temperature of a desert sand will decrease.



Concept (3.2) , lesson (1) , worksheet (3)

Q1) Choose the correct answer :-

1- B	2- c	3- a	4- d

Q.2) Complete the following sentences :-

1-less	2-heating	3-away from	4-wind – air current

Q.3) Give reason :-

1- Because the molecules of air move away from each other .

Q.4) What happens to ?

1-Hot water moves up and cold water falls down.

Concept (3.2) , lesson (1) , worksheet (4)

Q.1- Put (√) or (x):

1-x 2-√ 3-√ 4-x 5-√ 6-√ 7-√

Q. 2- Complete the following sentences:

1- drought 2- flooding 3- increase 4- decrease

Q.3- Write the scientific term:

1- Precipitation 2- Flooding 3- Dust storm

Q.4- Give reason for:

1- Because some ecosystems depend on floods such as e cosystems along the Nile.

2-Because sandstorms harm the human eyes and respiratory system.

Q.5-What happens to…?

1-They may be damaged by moving or breaking them.

2-Solar panels stop generating energy.

GEEL 2000 Language Schools



Primary (6), Unit (2)



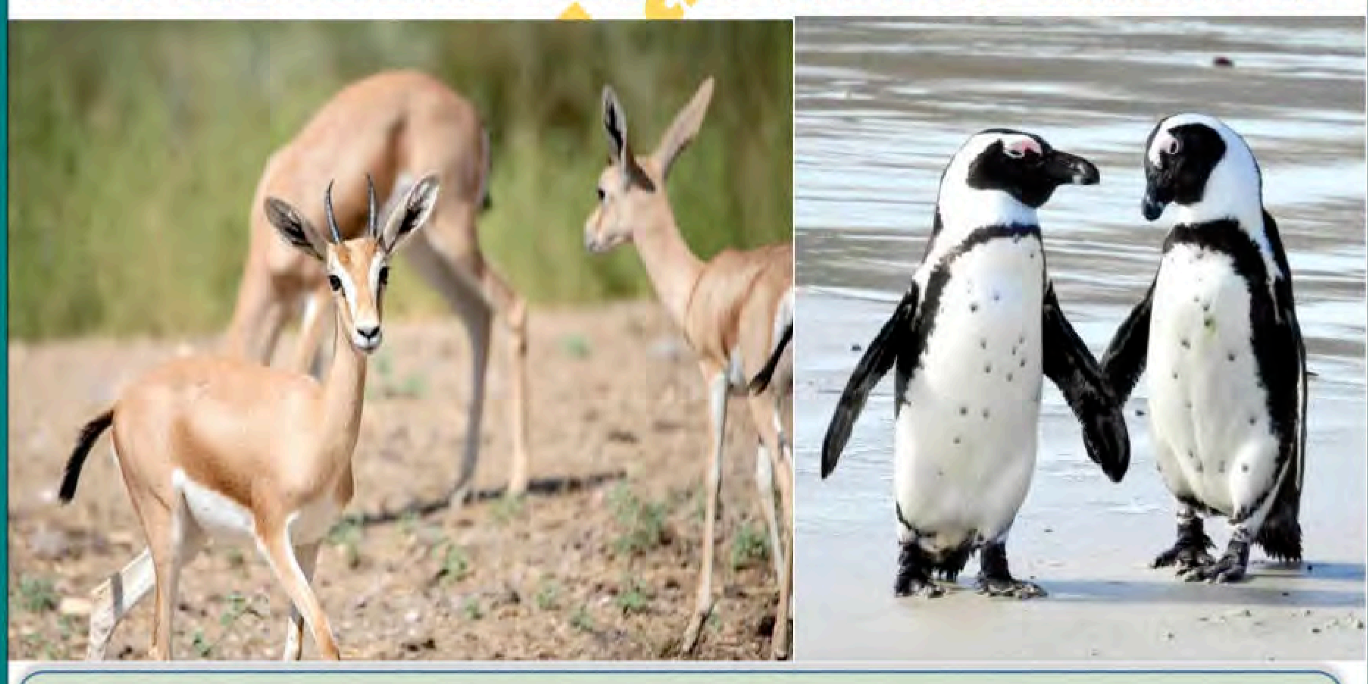
Second term

(2023-2024)

Concept (4.1, 4.2)

and

worksheets with model answer



Name: ……………………………………… Class: ……………………………..



Concept (4.1) Lesson (1)



Adapting to survive

How do environmental factors and genetic factors affect the growth of living organisms ?

- Living organisms can't survive easily in desert environment

  Due to the hard environmental factors such as extreme climate conditions.

- Living organisms can grow well when there are enough environmental resources such as water, food.... etc.



- living organisms adapt to the changes of the environmental conditions in their habitats and to the shortage in the environmental resources to survive.



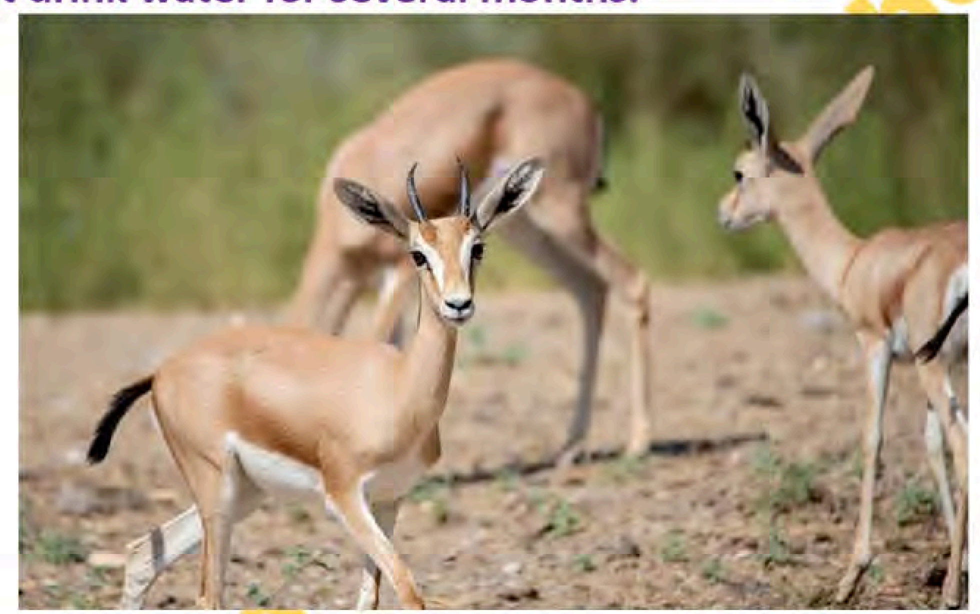




• Small dorcas gazelle is similar to its parents. **(Give reason)**

Because it gets some properties from its parents (genetic factors) that allow it to survive in desert environment such as:

- Its body color helps it to adapt its environment.
- It does not drink water for several months.



Adaptation:

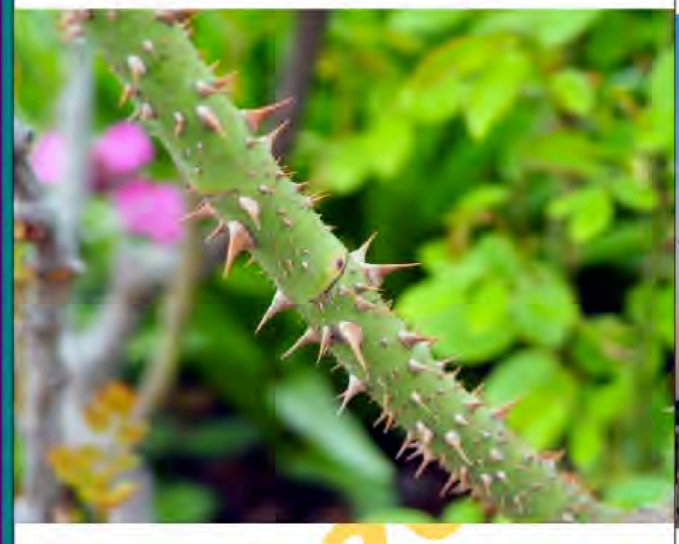
It is the process that helps living organisms to survive in the environment in which they live.





Types of adaptation



Structural adaptation (Physical adaptation)	Behavioral adaptation
Definition It is the adaptation that is related to the body structure of a living organism to help it survive.	**Definition** It is a change in the behaviors or acts of a living organism to help it survive.
Examples • Thorns on the stem of some plants. • The thick fur of some animals that live in cold climate	**Examples** • The growth of some plants toward light. • Bird migration.
	

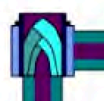
Bird migration:

•Migration is a behavioral adaptation as:

• Migration of a group of animals (like birds) move together from one place to another seasonally and they return to the place from where they are started (their cycle of migration is repeated.

Example of migratory birds: Steppe eagle.







Reasons of bird migration :

Birds migrate to search for the best conditions that help them reproduce (breed) and preserve their species, such as:

1. Different food sources.

2. Suitable habitats during different times of the year.

Environmental and genetic influences (effects) on migratory birds :

• Migratory birds may face many challenges during their journey such as :

- Extreme weather conditions.
- Shortage of food and water.
- Predators.
- Limited resting sites due to habitat loss.

✱Migratory birds have structural characteristics (physical traits) that help them to survive during their journey.

Migratory birds in Egypt :

Examples : Falcons - Eagles.

. The Red Sea and Nile River are from important stopovers for millions of migratory birds every year.









The main factors that attract the flocks of migratory birds to Egypt:

1. The moderate winter climate.
2. The area of Red Sea that contains different environments such as

- Coastal environment -Marine environment - Mountain environment.

Basic needs for living organisms :

Living organisms need some basic needs to survive such as:

•Food • Water • Habitat.

Influencing growth:

The environmental factors and genetic factors affect behaviors, structure and the growth of living organisms.

Examples of environmental factors:



1-Availability of water and light:

1. Affect the growth of plants as they make photosynthesis process.
2. Affect the growth of plants as trees, shrubs and animals in an ecosystem.
3. Affect the amount of plants on which some animals feed on.

2- Size of habitat.

It affects the number of different species that live in one place.







Examples of genetic factors (Hereditary traits)



1- The body size of animals.

It affects the growth of a kitten when its body size changes gradually until it becomes as its parents.

2- The length of plants.

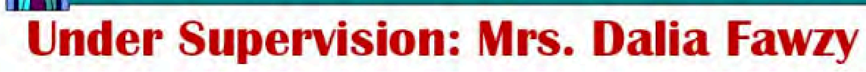
It affects the growth of plants like herbs usually shorter than the long flowering plants in a forest.



3- The fur color of animals.

It affects the shape of a young rabbit when it has brown spots on its fur, like its parents.







Worksheet (1)



Q.1 Put true or false:

1. It is easy for animals to live in the desert environments. (   )
2. Thorns on a plant stem, is an example of structural adaptation. (   )
3. Animals migrate from one place to another seasonally. (   )
4. Birds migrate to areas that have no food or water. (   )
5. Dorcas gazelle can live in both desert area and semi desert area. (   )
6. Availability of water is a genetic factor that affects the growth of trees and shrubs in an ecosystem. (   )
7. Migratory birds are affected by environmental factors during their migration. (   )

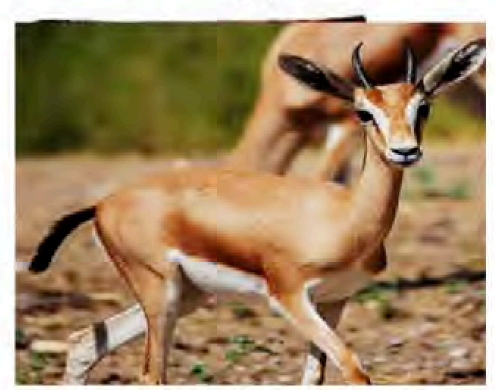
Q.2 Write the scientific term of each of the following:

1. A process through which the living organism be able to live and survive in its environment. (…………………………………..)
2. It is a type of behavioral adaptation in which animals move in a certain season from one place to another. (…………………………..)
3. An important stopover in Egypt for migratory birds, that includes marine, coastal and mountain environments. (…………………………..)
4. It is a change in the behaviors or acts of a living organism to help it survive. (…………………………..)
5. It is a change in the body structure of living organisms that helps them to survive. (…………………………..)

Q.3: Study the following two pictures, then answer The following questions:



Picture (A)



Picture (B)

(A) Put (✓) or (X) :

1. Animals in both pictures need food, water and habitat to survive. (   )
2. The animal in picture (B) has a body color helps it to survive in its desert environment. (   )
3. Animals in both pictures have a body size similar to its parents. (   )

(B) If you know that the bird in picture (A) is a migratory bird, write 2 reasons for its migration :

a-..

b-..





Concept (4.1) Lesson (2)



Characteristics of the Environment and ways of Adaptation of Living Organisms

There are different kinds of environments such as:

Arctic, desert and tropical rain forest environments.

► Each environment has:

- Its specific climate.
- Different types of animals and plants with traits that help them to survive in their environment such as:

Emperor penguin	African penguin
	
Location: The Antarctic.	**Location:** Along the coast of South Africa.
Adaptation: It has thick blubber (fatty layer) and its skin is covered with dense feathers to keep its body warm.	**Adaptation:** Around each of its eyes, it has a Circle of skin that doesn't have any feathers completely to help its body cool fast in hot weather.

Adaptation of different animals and plants in different environments:

a- Animals :

Environment (Habitat)	Animal	Structural adaptation	Reason
Arctic environment.	Arctic fox	It has thick white fur.	To warm its body
Tropical rain forest environment	Poison dart frog	It has colorful poisonous skin.	To hide from its enemies and protect itself from predators.
Desert Environment	Lizard	Its body is covered with sandy-colored scales.	To hide among the rocks in desert.

B Plants:

Plants in desert environment:



Location: Egypt's Western Desert.

Examples: Acacia trees, palms, opuntia, spiny shrubs and grasses.

Adaptations: Most of them are characterized by the following :

1- Size: Most of them are small and herbal.

2- Roots: Most of them have short extended roots near the Earth's surface to draw (absorb) any available water.

3- Leaves: Some of them have thick leaves to store water.

4- Stem:- ✱Some of them have thick stems to store water.

✱Some of them have thorns on their stems and branches to keep away herbivores (animals that eat plants).

Note: When the rain falls in deserts, some plants reach the flowering stage quickly and produce seeds that can live for a long time to adapt the shortage of rainfall.

Abiotic Factors and Adaptation

Ecosystem may be :

- **Small ecosystem such as :**

A small area of land between buildings that contains grass, insects and weeds.

- **Large ecosystem such as:**

The arctic where- Caribou feeds on grasses, wolves hunt caribou and other preys.

Ecosystem contains :

Biotic factors	Abiotic factors
They are living organisms in an ecosystem such as: Human -Animals - Plants.	They are non- living things That interact with each other in an ecosystem such as : Sunlight- Air- Water- Soil - Temperature - Precipitation.

• **Plants and animals live in the same ecosystem depend on each other to live and reproduce.**

► *The effect of abiotic factors on the growth of living organisms*



* **Light is an abiotic factor and Environmental factor:**

It affects the growth of plants.

* Plants respond to the amount of light and dark they receive daily.
* Some flowering plants may (produce) bear fruits when the days are longer than the nights in some environments.
* Light helps in the plant's growth.
* If light is too intense, it damages the plant's parts and cause their drying or burning.

* **The effect of abiotic factors on the adaptation of living organisms:**

* Water and light availability or limitation are considered the most important factors for the adaptation and survive of living organisms in their ecosystem.
* If water and light are not available, living organisms can't survive and will die.

Note

✱Living organisms have structural characteristics (physical traits) to adapt to abiotic factors in different environments.

✱These structural characteristics transfer from parents to offspring and help them to survive in extreme environmental conditions.

Limited resources in the desert :

- Deserts are the most extreme environments on the Earth.
- Deserts may hot area or cold area.
- All types of deserts have little rainfall.

Hot deserts

✱They have little amount of ground water far below the ground surface.

✱ Small pools of water are formed inside rocks during rains that falls for short periods of time on deserts.

✱Some plants which live in these environments **have long roots to get the deep groundwater.**

✱Other plants have short extended roots near the **Earth's surface catch the smallest drop of dew.**





Cold deserts-

✱ **Antarctica is a desert biome** that its temperatures are cold all the year.

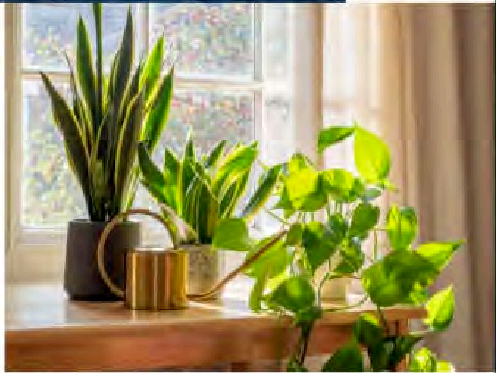
✱ Its temperatures in winter go below freezing **(below 0°C).**

✱ Its temperatures in the short summer reach a maximum of **(21°C).**



The plant's growth is affected by :

1. **The intensity (quantity) of light** affects the plant's growth.



2. **The duration of light** means the amount of time that a plant is exposed to light affects the plant's growth.

✱ Some flowering plants **bear fruits when the days are longer than the nights in some** environments.



✱ Some other flowering Plants grow and produce flowers when the days are shorter than the nights such as **Chrysanthemum plant**.

Worksheet (2)



Q.1 Put true or false:

1. Different types of environments have different types of plants and animals. (   )
2. Around each eye of emperor penguin, there is a circle of skin that doesn't have any feathers. (   )
3. Acacia trees and palms are adapted to live in desert environment.
4. When the rain falls in desert environment, some plants reach the flowering stage quickly. (   )
5. The skin of poison dart frog cannot protect it from predators. (   )
6. Ecosystems include living organisms only. (   )

Q.2 Write the scientific term of each of the following:

1. It contains biotic factors and abiotic factors that interact with each other. (……………………………….)
2. The factors that include living organisms in an ecosystem. (…….)
3. The factors that include nonliving things in an ecosystem. (…….)
4. It is a desert biome that has a cold climate all the year. (………..)

Q3 Complete the following sentences:

1. Emperor penguin lives in…… and it has a thick………and its skin covered with dense……………. to keep its body warm.
2. African penguin has a circle of skin that doesn't have any………. each of its eyes.
3. Some plants like palms and acacia trees live in the………. environment in Egypt.
4. Some desert plants can store water in their……….. and…………..

Concept (4.1) Lesson (3)

Inheritance of Traits in Living Organisms



✱ All living organisms inherit traits which transfer from parents to their offspring.

► Examples of inherited traits in living organisms:

✱ In humans such as eye color, nose shape .. etc.

✱ In animals such as fur color, fur length .... etc.

✱ In plants such as plant's length, shape of leaves ... etc.

✱ The inherited traits affect the structure of living organisms and their life.

✱ Genetic factors control what traits get passed down or inherited from parents to offspring

1- In animals :

Birman cat	Sphynx cat
It has long, silky hair with different colors. A Birman kitten inherits the long, silky hair from its parents.	It doesn't have any hair or may have only very fine hair. A sphynx kitten inherits its hairless body from its parents..

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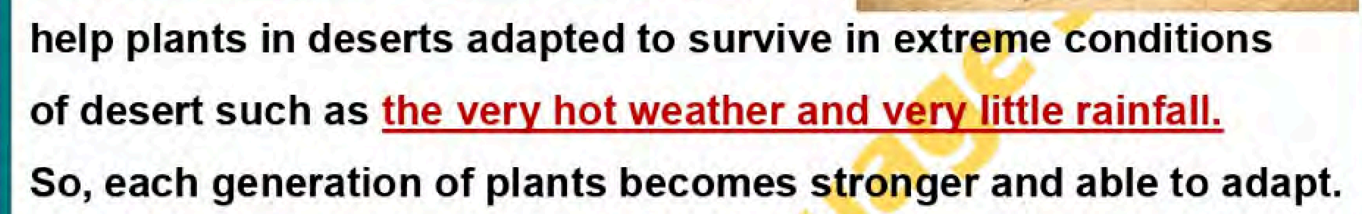
Give reason for:

Although Birman and sphynx are cats, there is no sphynx cat has long hair like Birman cat.

Because sphynx cat doesn't have the genetic factor for long hair which is found in Birman cat.

2 Plants in the desert:

Inherited traits which transfer from parent plants to their offspring, help plants in deserts adapted to survive in extreme conditions of desert such as the very hot weather and very little rainfall.
So, each generation of plants becomes stronger and able to adapt.



The factors that affect the human growth health and behavior development:.

1. **Lifestyle choices.**
2. **Environmental factors.**
3. **Genetic factors.**

1- Lifestyle choices :



- They affect the health and they depend on habits.
- Bad habits like smoking and eating a diet full of chips and soda will negatively affect and harm your health and your growth.





✱Good habits like eating a healthy food and doing exercises play an important role in your growth and develop your health and behaviors.

2- Environmental factors :

✱They are outside factors which we might not have the ability to control.

✱ If your environment is healthy and clean, it will positively affect your health and your growth.

✱Your health and growth will be negatively affected, if there are some problems in your environment, such as:

- Health care is not available.
- Water may be far away or unsafe to drink.
- Difficulty to obtain food.
- Sanitation service is not available, that causes spreading of different diseases.

3- Genetic factors :

- They affect the body structure as your hair color or eye color are like your parents.
- Genetic factors control the transfer of inherit traits from parents to offspring.

Genes



Are tiny structures which found in the nucleus of the cells of living organisms.

✱ Genes carry inherited traits from parents to offspring,

✱Genes are responsible for determining the body features such as :

-The way of your earlobes hang.

- The length of your fingers.

- How tall you.







Worksheet (3)

Q.1-Give reasons for :

1. A birman kitten has a long and silky hair.

....

2. Sphynx cat doesn't have long hair.

....

3. Your lifestyle choices affect your health.

....

Q.2- What happens if...?

1. The genetic factor of hairless body trait is transferred from sphynx cats parents to their offspring.

....

....

2. The inherited traits are transferred from desert plants to another through generations.

....

....

Q.3- Study the following figures, then answer the following questions:


Photo no. (1)


Photo no. (2)


Photo no. (3)

(A) Complete the following sentences :

1. Photos numbers (.........) and (.........) represent bad habits.
2. Photo number (.........) represents a good habit.

(B) Put (✓) or (X) :

1. Photo number (3) represents an environmental factor that positively affect human health. (   )
2. Photos numbers (1) and (2) are related to genetic factors. (   )
3. Photos numbers (2) and (3) are represent good lifestyle choices. (   )
4. All photos show habits that have different effects on the human health. (   )





Concept (4.2) Lesson (1)

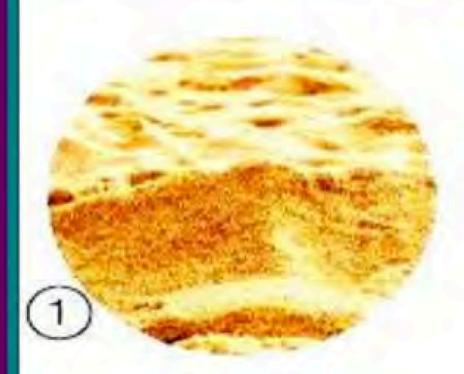
Soil and environmental change



Soil :

- ✓ It is the loose layer (delicate skin) which covers the Earth's
- ✓ crust. **OR**
- ✓ It is a basic factor for all natural ecosystems on Earth.

Types of soil:

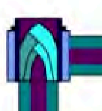






 Sandy Soil  Slit Soil  Clay Soil

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The differences and similarities between the different types of soil

Differences	Similarities
They have different colors and textures.	All types of soil are composed of natural components.
The size of soil particles may be large, medium or small.	All types of soil keep the life on Earth.

Effects of environment on the soil:

When the air temperature increases in an environment, the soil will dry and may lose its nutrients.

Give reason for:

The environment varies according to the type of soil.

➡because the soil has an important role to determine the type of plants that grow in it, and the species of animals which live in this environment.

The formation of soil :-

Soil is formed of some ingredients (components) such as :

1- Sand, gravel and minerals which are formed due to breaking down of rocks through the weathering process.

2- Organic materials such as dead plants.

3- Living organisms.

4- Water.







The main processes in the formation of different landforms on Earth and soil .



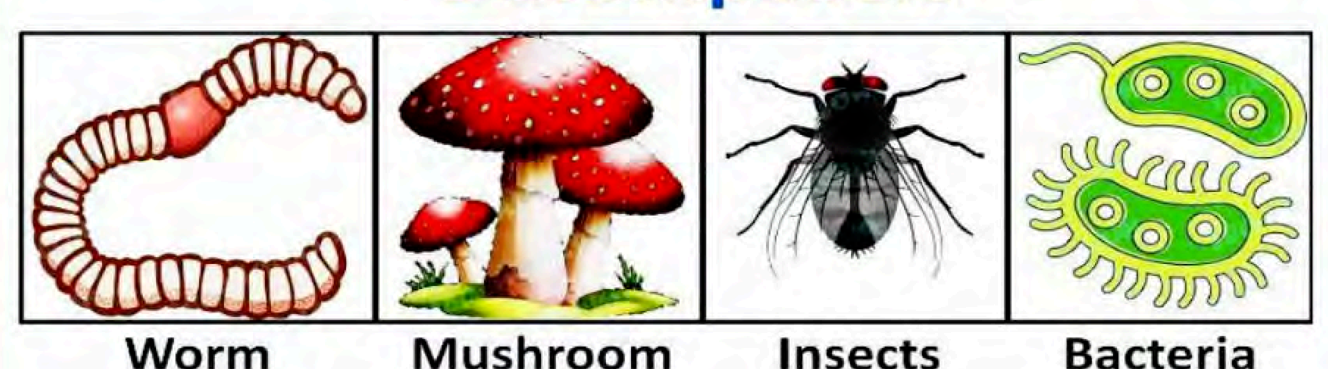
Weathering and erosion.



Importance of soil:

1. Soil is important for the plants that people and animals feed on to survive.
2. Soil provides the plant with its basic needs for growth as air, water and nutrients.
3. Some living organisms make their shelters in soil such as: **worms, insects, fungi and bacteria.**

Decomposers



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❖ Composition of the soil:

1- Small pieces of rocks, sand, gravel and minerals which are formed due to breaking down of rocks through the weathering process and other dark colored materials.

2- Organic materials such as dead plants (small pieces of leaves and branches (twigs) of trees.

3- Living organisms and water.

4- Other components of soil that can't be seen with naked eyes.

All types of soil are composed of

- **Inorganic ingredients**: They are the non- living components of soil like air, water, rocks and minerals.
- **Organic ingredients**: They are living components of soil like remains of dead plants and animals.

Note:-

Rocks: are composed of different types of minerals.

Minerals: they are the building units (blocks) of rocks.

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➢ How inorganic materials of soil formed..?



During weathering process: due the effect of water and wind, the rocks are broken down into small pieces such as particles of sand, silt and clay.

During erosion process: the small pieces of rocks move from one place to another.

During deposition process: these small pieces of rocks will deposit and mix with other ingredients forming different types of soil.

➢ How organic materials of soil formed :

-Decomposers recycle the remains of dead plants and animals into chemical nutrients such as carbon, nitrogen and oxygen which are released into soil, water and air that help in the flowing of energy in the environment again.

-Decomposers break down the organic material of dead organisms into components rich with nutrients which called "**humus**" which increases the soil fertility that helps plants to grow.

Give reason for

1- Decomposers such as: fungi, bacteria and earthworms play an important role in the formation of soil.

2- Decomposers have an important role in the formation of soil.

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➡because, they recycle the remains of dead plants and animals into chemical nutrients such as carbon, nitrogen and oxygen which are released into soil.

Note:

-Minerals and organic materials represent about half of the most types of soil.

-The other half of soil consists of spaces between the particles of the soil known as : pore spaces (each pore space is filled with water and air).

❖Different soils, different ingredients:

There are many types of soil.

➡ Due to the different amounts of ingredients that form them.

The difference of the amounts of organic ingredients in the soil lead to:

1- Changing the appearance of the soil.

2- Changing the amount of nutrients that is available for plants.

The difference in the size of particles and amount of different inorganic ingredients leads to:

- Changing the appearance and texture of the soil.
- Changing the ability of soil to retain (keep) water.
- Changing the ability of soil to allow roots to grow.




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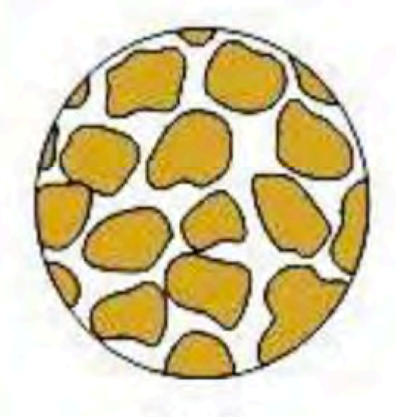


Examples:

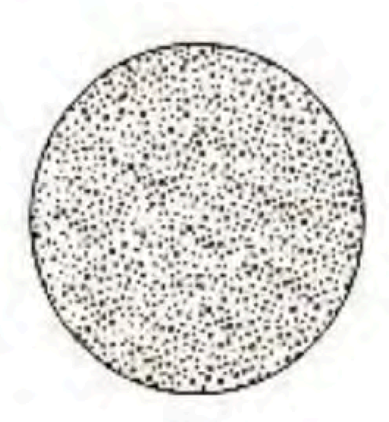
Sand ➡ has large particles

Silt ➡ has medium particles

Clay ➡ has small particles



Sand



Silt



Clay



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Worksheet (1)

Q.1 -Write the scientific term of each of the following:

1. Living organisms help in recycling nutrients from dead plants and animals back to the soil. (……………………..…………..)
2. The loose layer that covers Earth's surface. (…………………………..)
3. The spaces between soil particles. (…………………….………..)
4. The process which breaks down rock into small particles.

   (……………….……………..)

Q.2 - Complete the following sentences:

1. Soil is composed of many inorganic ingredients as ………………….., ………………….., …………………….and minerals.
2. The processes which play an important role in the soil formation are weathering, ………..……..…… and …………………..
3. The building units of rocks are called ………………………
4. The remains of dead plants and animals are decomposed into chemical nutrients such as ……………….,……………. and ………………….

Q.3- What happens to …?

1. The soil if it does not contain any decomposer organisms.

   ………………………………………………………………………………

   ………………………………………………………………………………

2. The soil if the temperature in the environment increases.

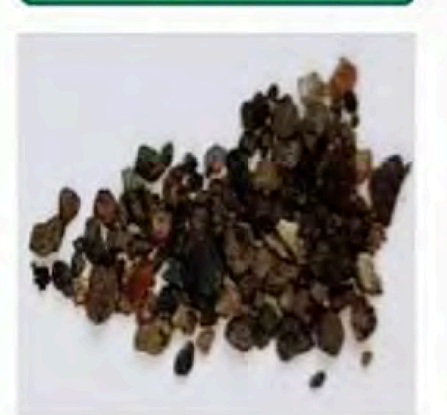
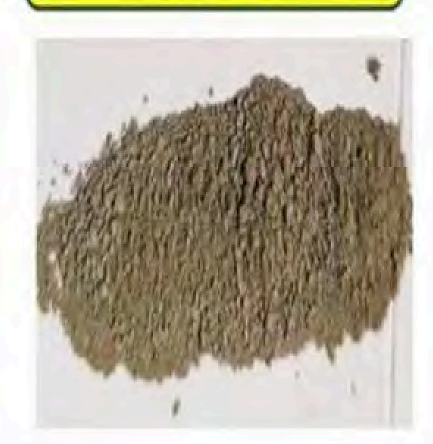
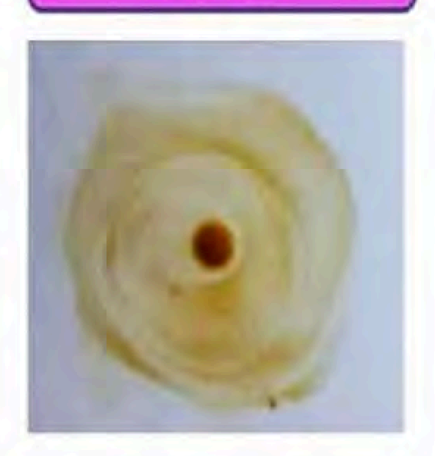
   ………………………………………………………………………………

   ………………………………………………………………………………

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Characteristics of the different soil particles

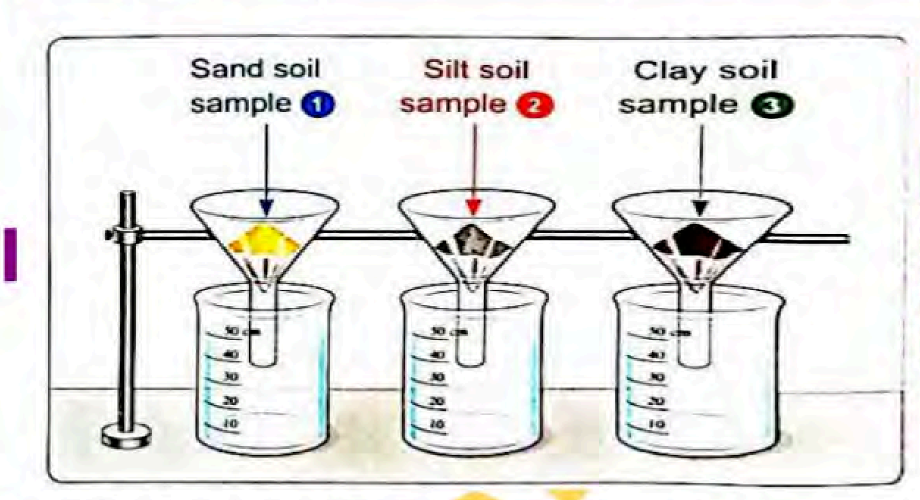
SAND	SILT	CLAY
		
1. Large in size 2. Large space between particles 3. Gritty, rough or coarse 4. Non- Sticky 5. Good drainage ability 6. Poor water holding capacity	1. Medium in size 2. Medium in space 3. Smooth and slipping, floury 4. Non- Sticky 5. Medium drainage ability 6. Medium water holding capacity	1. Very fine in size 2. Small space between particles 3. Sticky when wet 4. Hard when dry 5. It swell and shrink 6. It absorbs water 7. Poor drainage 8. Good Water Holdding Capacity





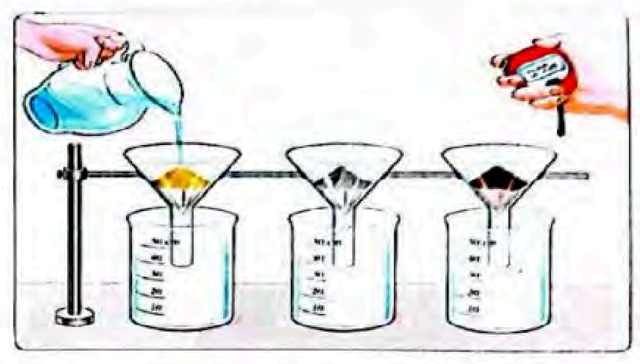
Comparison between the three types of soil:

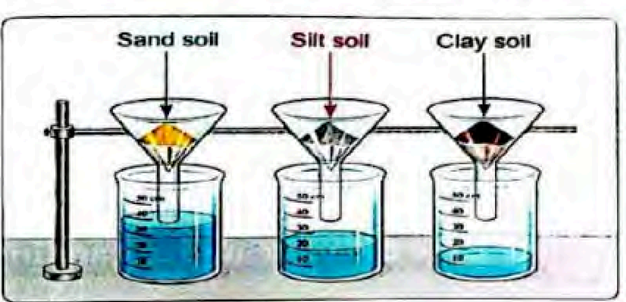
Points of comparison	Sand soil	Silt soil	Clay soil
The size of particles	Large	Medium	Small
Color	Yellow	Gray	Dark
Flowing of water through it	Fast	Medium	Slow
Retaining water:	Small	Medium	Large



Funnels inside measuring cups

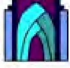
Pouring 50 ml of water in each funnel, and at the same moment, start to record the time by using stopwatch.





Conclusion :

- **Sand soil** (sample 1) : allows water to flow fast through it, this means that it has large amount of pore spaces (pores) between its particles, so sand soil can retain (hold) small amount of water.
- **Silt soil** (sample 2) : allows a medium amount of water to flow through it, this means that it has medium amount of pore spaces between its particles, so silt soil can retain (hold) medium amount of water.
- **Clay soil** (sample 3) : allows water to flow slowly through it, this means that it has small amount of pore spaces between its particles, so clay soil can retain (hold) more amount of water.



Give reason for:

The soil that retains medium amount of water becomes more fertile.

Because it keeps its organic materials and this helps in the plant growth.

Soil and climate :

- The soil is formed **of many layers.**
- Both soil and climate affect each other in the ecosystem as: the types of plants that grow in a certain soil have a large impact on the temperature and also, the climate of any ecosystem affects the characteristics of the soil in it.

Example :

1-The humid areas:

• During rainfall, the soil of **humid areas retains large amount of water**, that may **wash down the nutrients of the soil**, so some **minerals may fall below** the soil layers, this will form **a hard layer that plant root can't penetrate.**

Give reason for:

The roots of some plants can't grow and some living organisms can't live in humid area .

➡ **because, these areas become water logged soils that contain very large amount of water and little amount of air**





2-The hot – dry areas:



Give reason for:

In hot and dry areas, the soil which rich with clay particles, the clay becomes dry.

Because of drought conditions that will form a layer doesn't allow much water to flow.

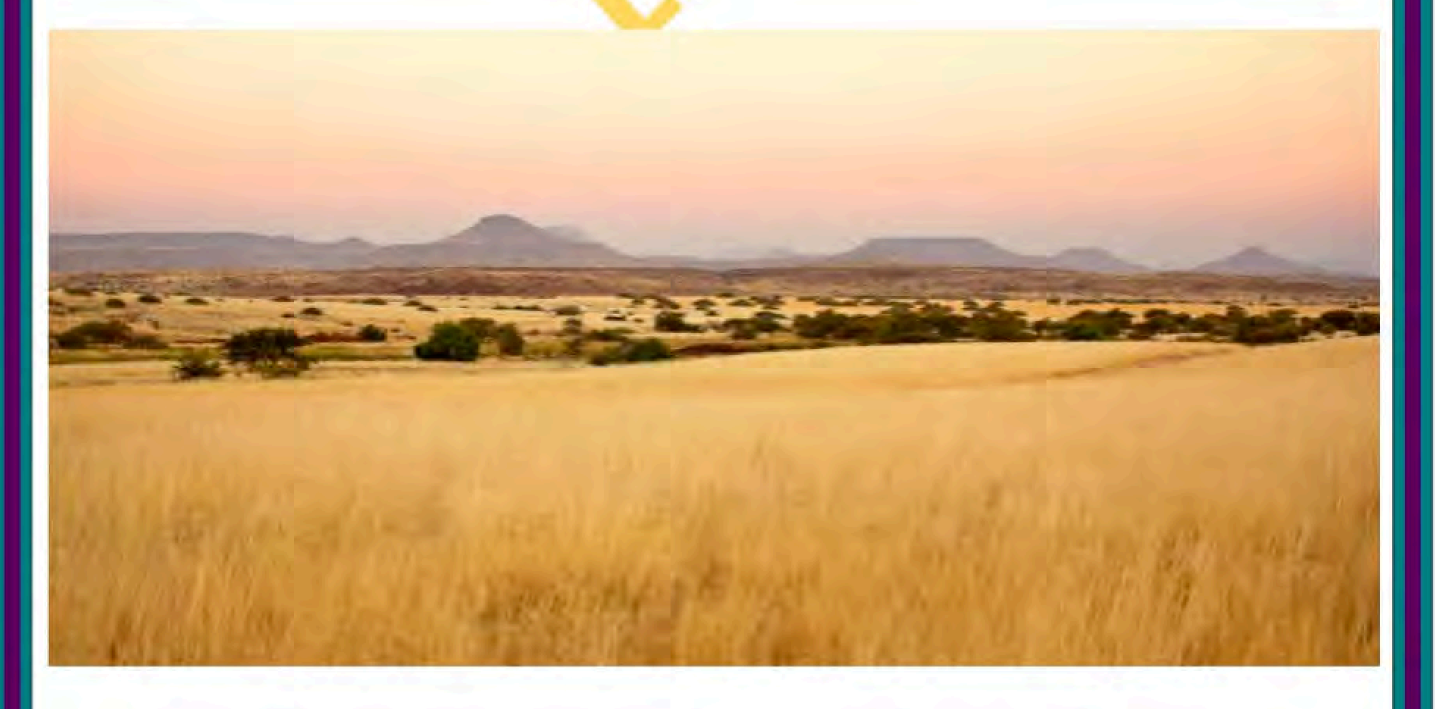


3- Dry soils:

- The sand soil is dry and loose that **drains water quickly**.

  So, **large trees can't grow in it.**

- **Savannas are grassland ecosystems** that contain **dry sand soil** and they are common in **central Africa .**





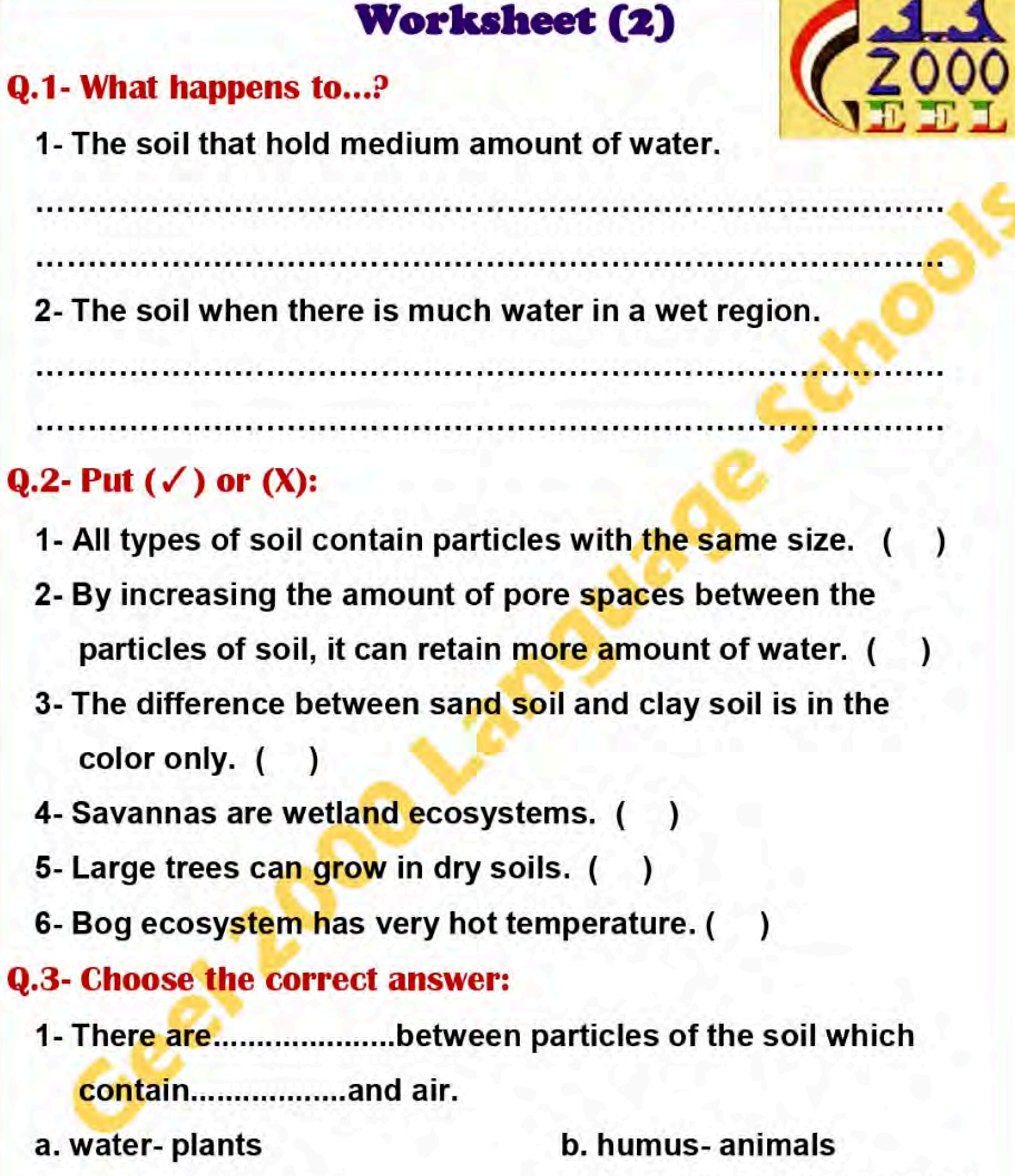
Living organisms live in savannas depend on each other in feeding like:

Savannah contains a variety of grasses and small plants.	Eaten by →	Herbivores such as gazelles (deers) depend on these grasses and small plants.	Eaten by →	Large and fast carnivores such as lions and cheetahs (leopards) depend on herbivores as gazelles (deers).

❖ **Soil in a bog :**

- Clay soils which rich with clay particles retain much water, so the soil may be wet most of time.
- Most of plants that grow in this wet soil are basic for bog ecosystem.
- The moist conditions in bogs, lead to very cool temperatures.
- The most common animals live in bog ecosystems are: frogs and mosquitoes





Worksheet (2)

Q.1- What happens to...?

1- The soil that hold medium amount of water.

....

....

2- The soil when there is much water in a wet region.

....

....

Q.2- Put (✓) or (X):

1- All types of soil contain particles with the same size. (   )

2- By increasing the amount of pore spaces between the particles of soil, it can retain more amount of water. (   )

3- The difference between sand soil and clay soil is in the color only. (   )

4- Savannas are wetland ecosystems. (   )

5- Large trees can grow in dry soils. (   )

6- Bog ecosystem has very hot temperature. (   )

Q.3- Choose the correct answer:

1- There are....................between particles of the soil which contain.................and air.

a. water- plants   b. humus- animals

c. pore spaces water   d. dead plants - dead animals

2- Silt soil contains................particles and its color is...............

a. large – yellow. b. medium- dark.

c. large- dark. d. medium -gray.

3- Clay soil allows water to flow.............as it has...........pore spaces between its particles.

a. fast – small b. slow – large

c. slow- small d. sand – clay

4- The color of sand soil is...............

a. yellow. b. gray. c. black. d. red.

5- Waterlogged soil contains .... amount of air and this doesn't help .... to grow.

a. large – animals b. little – animals

c. little – roots d. large- flowers

6- Savannas are.................. ecosystems.

a. wet polar b. wet grassland

c. dry polar d. dry grassland

13- .... and............. are the most common animals that live in bogs.

a. Mosquitos – frogs b. Lions- tigers

c. Gazelles- zebra d. Lions – frogs





Concept (4.2) Lesson (3)

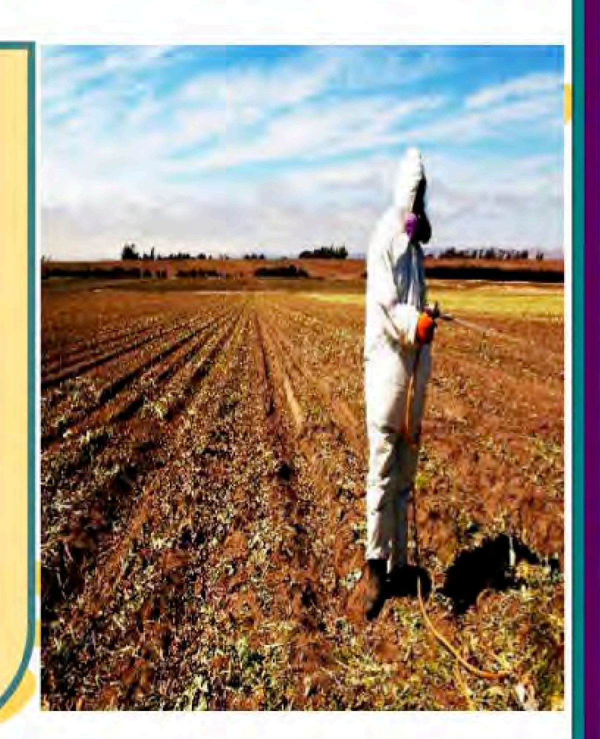


❖ **Poor agricultural practices have many impacts on the soil such as:**

1- Deplete the soil:

❖ **Due to:**

1. Converting fertile agricultural lands (arable lands) into cities, factories and pastures.
2. Overuse of pesticides.
3. Overuse of chemical fertilizers.
4. Air and water pollution.



2- Desertification:

It is a process by which the land becomes infertile due to deforestation, drought or overgrazing.



Ways of soil restoration:

1. Adding nutrients which have been depleted back into the soil by using
   - ✓ Crop remains (residues) like: straw and stems (stalks).
   - ✓ Natural fertilizers like animal's manure.
2. Crop diversification which means planting different types of crops and rotating them with crops that keep the soil fertility.



Factors affecting crop quality:

- **The quality of some crops (like tomato) is affected by many factors such as:**

1. Regular and moderate irrigation.
2. Adding suitable amount of organic fertilizers.

Unsuitable environmental factors may lead to:

1. **Producing weak plants.**
2. **Reducing the amount of crops.**
3. **Spreading of plant diseases among crops**

Erosion process of soil:

- **There are many factors that lead to the erosion of soil such as:**

1. **The type of soil.**
2. **Removing plants.**
3. **Increasing the amount of water.**
4. **Increasing the inclination (slope) of the Earth's surface.**

All the previous factors lead to increasing the speed of moving water over the Earth's surface.

The soil particles are washed down by moving water and causes soil erosion.

➢ Ways to reduce the soil erosion process:

1. Increasing the planted areas.
2. Digging canals or trenches to collect the excess water in the soil.
3. Adding sand and silt to the soil that help in decreasing the effects of moving water over the soil.



➢ Habitat destruction:

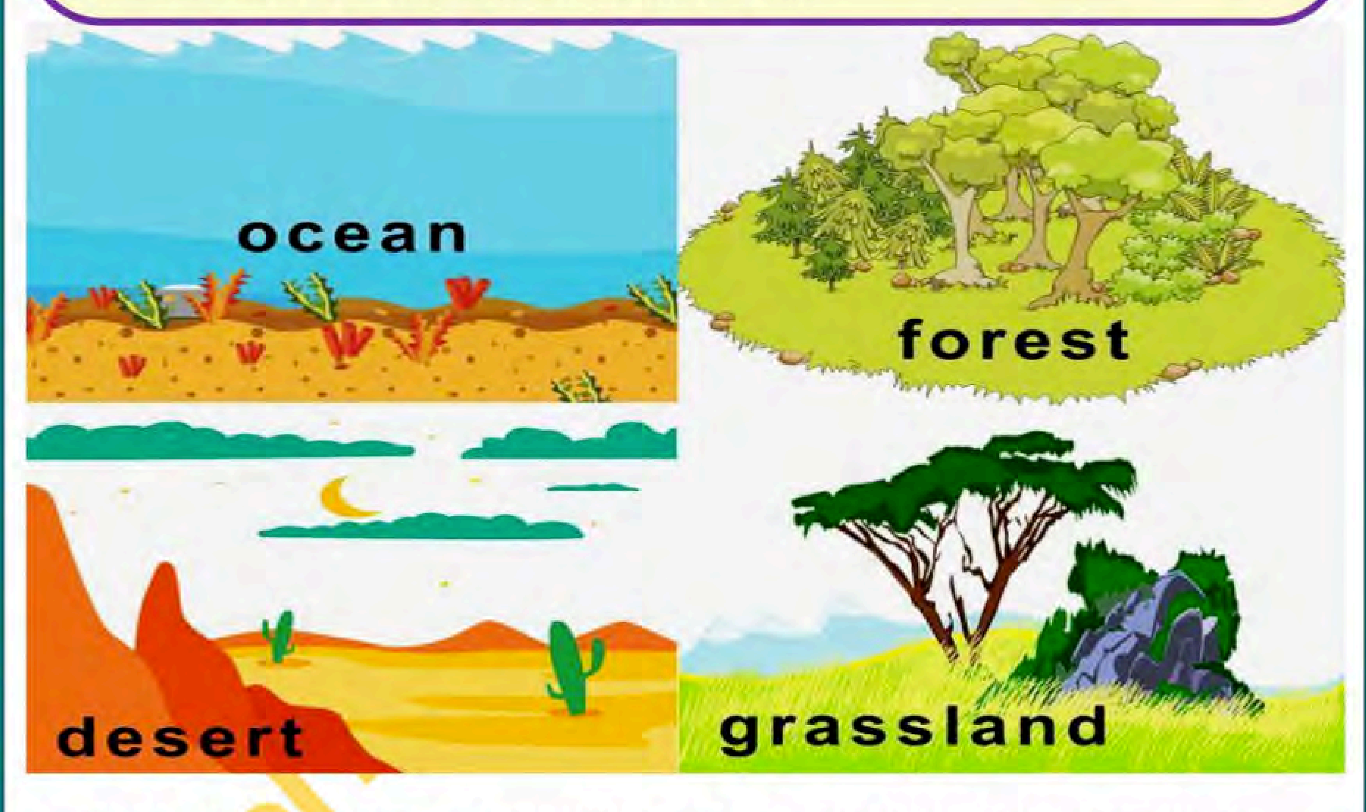
Habitat: It is a place where living organisms live.

Examples of some habitats:

Desert – Forest – Stream – Ocean – Grassland

All habitats provide four important things for living organisms, which are:

Food – Water – Shelter – Space to live



- Habitat destruction, when one of the previous four things is depleted or taken away.
- Any change, even a small one in a habitat may cause a large reaction from nature.






➢ Habitat destruction is due to:

.Natural changes as:

- Hurricanes.
- Fires.
- Floods.
- Volcanic eruptions.
- Destructive earthquakes.
- Diseases of living organisms.
- Lack of food for many living organisms.

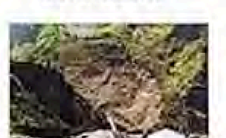
Flood



Earthquake



Drought



Landslide



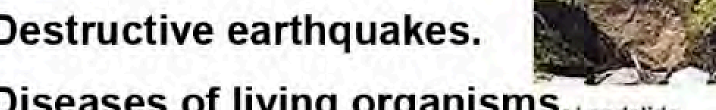


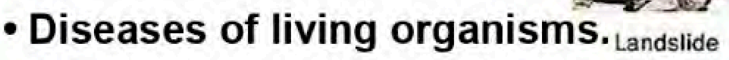
Tsunami



Forest Fire







➢ Benefits of habitat destruction:

✱Volcanic eruptions: make the soil fertile.

✱Forest fires: release seeds from closed fruits (sealed pods).

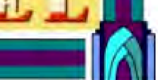
✱Diseases of living organisms: keep populations of animals to a suitable number that can be controlled in an ecosystem.

➢ Human activities that cause habitat destruction:

1. Building houses.
2. Building factories to produce goods.
3. Construction of infrastructure such as roads and railway tracks for the transportation of both people and materials.

➢ Human activities cause many harms to the habitats as:

1. Natural spaces, such as hills, prairies and valleys are turned into factories and homes that led to deforestation.
2. Lands have been destroyed for mining, making road and airport runways.



3. Pollution and waste produced by humans have led to an increase in the percentage of carbon dioxide gas and other gases in the atmosphere, which lead to an increase in the Earth's temperature.

➢Climate change:



- **Human activities can cause habitat destruction which makes climate change.**
- **The climate change may lead to extinction of living organisms where:**

1. Humans cause increasing the rate of the climate change on the Earth.
2. This rate leads to the changes of habitats which all living organisms depend on.
3. Living organisms (plants and animals) are affected by the changes in their habitats, so they change their behaviors to adapt to their new habitats.
4. Sometimes living organisms can't adapt or move in new conditions and this leads to their extinction.

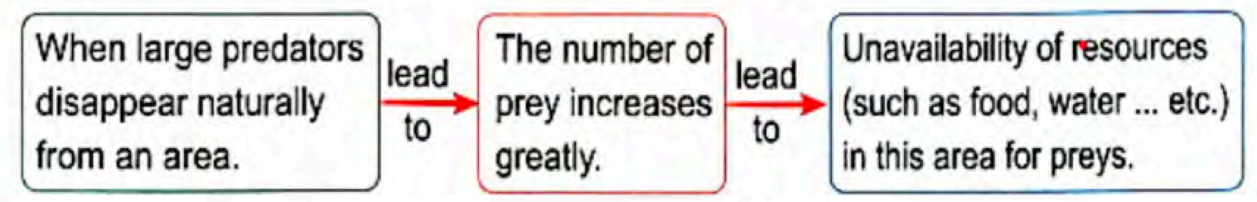
Overpopulation

It is the increase in the number of a certain species of living organisms in a habitat.

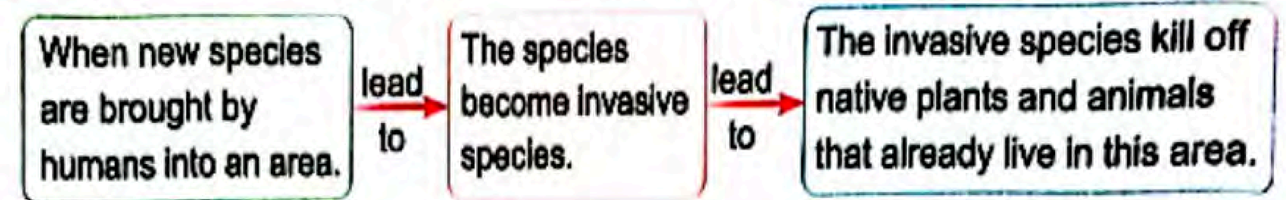
- It leads to less food, water, shelter and space for other populations (organisms) that live in the same habitat.



1 Overpopulation may happen due to natural changes:



2 Overpopulation may happen due to human activities:



Example of an invasive species:

In some areas of the Red Sea, lionfish are the reason for the loss of 79% of young fish of the native species population.



Sometimes humans are doing the same damage as invasive species, because the overpopulation of humans causes shortage of some resources (such as food, water, ... etc.) for both humans and other organisms on Earth.

Worksheet (3)



Q.1- Cross out the odd words or phrases:

1. Drought - Deforestation - Overgrazing - Overuse of pesticides.

   (……………………………….)

2. Air and water pollution - Overuse of pesticides - Overgrazing – Overuse of chemical fertilizer. (……………………………….)

3. Adding nutrients to the soil - Planting different types of crops – converting fertile agricultural lands into cities. (………………)

4. Hurricanes - Volcanic eruptions - Remove forests to build houses – Forests fires. (…………………………..)

Q.2- Give reasons for:

1. The increase in the inclination of Earth's surface causes the erosion of the soil.

………………………………………………………………………………………

………………………………………………………………………………………

2. Scientists and farmers should use crop remains like straw and stem in the soil.

………………………………………………………………………………………

………………………………………………………………………………………

3. Desertification process increases recently.

………………………………………………………………………………………

………………………………………………………………………………………

Q.3- What happens to ...?

1. The soil when fertile agricultural lands are converted into factories or pastures.

....

....

....

2. The soil when farmers increase the planted areas.

....

....

3. The habitat when the number of predators decreases.

....

....

Q.4- Classify the following activities into natural activities and human activities that lead to habitat destruction.

(Hurricanes – Floods – Building houses – Destructive earthquakes – Making road and airport runways)

Natural activities	Human activities
....	....
....	....
....	....
....	....

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Concept (4.2) Lesson (4)



Reducing water pollution

- The human population is constantly increasing that lead to increasing the number of industries which use water, and also increasing the rate of water pollution.

Methods of reducing water pollution



1. Treatment of sewage and industrial water.



2. Keeping green areas.



3. Using suitable amounts of fertilizers.



4. Getting rid of trash in correct ways.



5. Using soil fences and sedimentation ponds.



6. Controlling air pollution that produced from cars and industry can reduce water pollution.

✸Preventing water pollution is more effective than cleaning up pollution from water that requires a lot of time and effort.

✸Healthy soil is important to maintain healthy ecosystem, as the soil keep the life on the Earth.

✸ All living organisms depend on the soil to get their needs.

✸ Human like all living organisms need shelter to survive, but the processes of making building materials can cause pollution which damage the environment.

➢ Harms of traditional bricks



- **Soil scientists and engineers hope to stop depending on traditional bricks and concrete, because they cause harms for the environment, where:**
- **The bricks must be** burned at more than 1000°C.
- The ingredients of cement must be burned at 1450°C.
- The manufacture of bricks **and cement require a lot of energy and produce a lot of pollution.**

Using soil to build sustainable homes:





- Scientists transform soil into building materials where they add chemicals to the soil that turn the clay of soil into glue like substance which bind the materials together.
- The glue-like substance is made by chemical change of the soil.
- In this process, the scientists don't use the topsoil which is used for agriculture, but they use the subsoil which is found beneath the topsoil that is available around the Earth.
- The new substance is used to build sustainable homes instead of the traditional bricks.



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Worksheet (4)



Q.1- Look at the opposite photo then answer:



A) Put (✓) or (X):

1. Human activities increase water pollution. ( )
2. Air pollution can cause water pollution. ( )
3. Using large amounts of fertilizers reduce water pollution. ( )

B) Complete :

1. To reduce water pollution we have to treat .... and .... water before throwing them into any water body.
2. Using .... fences and .... ponds decrease water pollution.

Q.2 - Give reasons for:

1-Soil scientists and engineers hope to stop using traditional bricks and concrete in building houses.

....

2- We should keep green areas and reduce the amount of fertilizers.

....

Q.3 - What happens to ...?

1- The sea water if industrial water is thrown into the sea without treatment.

....





Concept (4.1) , lesson (1) , worksheet (1)



Q.1:

1. (X) 2. (✓) 3. (✓) 4. (X) 5. (✓) 6. (X) 7. (✓)

Q.2

1. Adaptation. 2. Migration. 3. The Red Sea.
4. Behavioral adaptation. 5. Structural adaptation.

Q.3

(A) 1. (✓) 2.(✓) 3. (✓)

(B) a. search for different food resources.
b. search for another suitable habitats.

Concept (4.1) , lesson (2) , worksheet (2)



Q.1:

1. (✓) 2. (X) 3. (✓) 4. (✓) 5. (X) 6. (X)

Q.2

1. Ecosystem. 2. Biotic factors.
3. Abiotic factors. 4. Antarctic region.

Q.3

1. Antarctic - fatty layer-feathers 2. feathers
3. desert 4. leaves - stems.

Concept (4.1) , lesson (3) , worksheet (3)

Q.1

1. Because it inherits this trait from its parents.
2. Because it doesn't have the genetic factor for long hair.
3. Because it depends on your behavior which may be good habits or bad habits.

Q.2

1. The trait of hairless body appears on the offspring.
2. The desert plants are more adapted to survive in extreme desert conditions.

Q.3

(A) 1. (1) and (3) 2. (2)
(B) 1. (×) 2. (×) 3. (X) 4. (✓)



Concept (4.2) , lesson (1) , worksheet (1)

Q.1- Write the scientific term :

1- Decomposers. 2- Soil.
3- pore spaces 4- weathering.

Q.2- Complete the following sentences:

1- Air, water and rocks
2- Erosion and deposition
3- Minerals
4- Carbon, oxygen and nitrogen

Q.3 What happens to ...?

1. The soil will lose the chemical nutrients that are found in dead plants and animals
2. The soil will dry and may lose its nutrients.



Concept (4.2) , lesson (1) , worksheet (2)

Q.1- What happens to...?

1-The soil keeps its organic materials, so it becomes more fertile.
2-The soil becomes waterlogged
soil and doesn't help roots of plants to grow in it.

Q.2 -Put (✓) or (X) :

1- (X). 2- (X). 3- (X).
4- (X) 5- (X) 6- (X).

Q.3- Choose the correct answer:

1- c. 2- d. 3- c. 4- a.
5- c. 6- d. 7- a.

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Concept (4.2) , lesson (1) , worksheet (3)



Q.1 Cross out the odd words or phrases:

1. Overuse of pesticides (all items are the reasons of desertification, while overuse of pesticides causes depletion of the soil).
2. Overgrazing (all items cause soil depletion, while overgrazing causes desertification).
3. Converting fertile agricultural lands into cities, (all items. help in soil restoration except converting fertile agricultural lands into cities).
4. Remove forests to build houses. (all items are from natural change that lead to habitat destruction, while remove forests to build houses is from human activities)

Q.2- Give reasons for:

1. Because the speed of moving water over Earth's surface increases, so the soil particles are washed down by moving water
2. To add nutrients to the soil, so the soil can be restored.
3. Due to deforestation, drought and overgrazing.

Q.3- What happens to ...?

1. Soil depletion may happen.
2. The fertility of the soil will increase, so the soil can be restored.
3. The number of preys increases greatly and this leads to the lack of resources in this habitat so it causes habitat destruction.
4. The sea water will be polluted.

Q.4- Classify:

Natural activities	Human activities
– Hurricanes. – Floods. – Destructive Earthquakes.	– Building houses. – Making road and airport runways.






Concept (4.2) , lesson (1) , worksheet (4)

Q.1- Look at the opposite photo then answer:

(A) 1. (✓) 2. (✓) 3. (✗)

(B) 1. sewage – industrial

2. soil – sedimentation

Q.2- Give reasons for:

1- Because they need large amount of energy to be manufactured and produce a lot amount of pollution.

2- To reduce water pollution.

Q.3- What happens to ...?

1- The sea water will be polluted.



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